WSRC-TR-96-0417

Characterization of Residual Chlorinated Organic Compounds in the Soil and Sediment at the Wilson's Corner Site

by

R. L. Nichols

Westinghouse Savannah River Company
Savannah River Site
Aiken, South Carolina 29808

T. R. Jarosch

K. M. Jerome

DOE Contract No. **DE-AC09-96SR18500**

DISCLAIMER

WSRC-TR-96-417

CHARACTERIZATION OF RESIDUAL CHLORINATED ORGANIC COMPOUNDS IN THE SOIL AND SEDIMENT AT THE WILSON'S CORNER SITE (U)

January, 1997

R. L. Nichols
T. R. Jarosch
K. M. Jerome

Westinghouse Savannah River Company
Savannah River Site
Aiken, SC

Prepared for the National Aeronautics and Space Administration under NASA HQ Order # W-18,895

Summary

Depth discrete bulk sediment samples were collected from 15 different locations at the Wilson's Corner site on the Kennedy Space Center during August 1996. Approximately 800 feet of continuous core and 800 sediment samples were collected. Four hundred of the samples were analyzed for chlorinated volatile organic compounds (CVOCs) using a modified version of EPA Method 5021 for headspace analysis of CVOCs in soil and water samples.

Sediments beneath the Wilson's Corner Site at the Kennedy Space Center contain residual trichloroethylene (TCE), cis-dichloroethylene (cDCE), vinyl chloride (VC), and Freon-113 (F113). Trichloroethylene has moved downward beneath source areas through the porous surficial aquifer along bedding planes until it encountered a silty sand and clay layer and then began to move laterally through the silty sand layer and along the top of the clay layer. Anaerobic biodegradation of trichloroethylene has produced cis-dichloroethylene and vinyl chloride along the migration path. The highest concentrations of CVOCs are immediately below the source areas and in a depression at the base of the surficial aquifer located south of the current stripper control room building.

Currently the Wilson's Corner Site has a network of recovery wells operating to maintain hydraulic control of the contamination and remove contaminant mass. Future remediation enhancements should focus on improved source term remediation and optimizing natural bioremediation, such as; Dual phase remediation of sediments in the source areas, installation of a deep recovery well near sampling location NASA1 where the depression in the surficial aquifer is located, air sparging at the leading edge of the plume to degrade biodegradation products, and targeted excavation of shallow contaminated soils.

Introduction

The Wilson's Corner site is located east of Titusville, Florida on the Kennedy Space Center (KSC) on the north side of State Route 402. Wilson's Corner was the location of the Propellant Systems Components Laboratory which was constructed in 1963. In addition to the laboratory building a facility for solvent cleaning of components such as rocket fuel lines was located east of the main building. Solvent storage tanks were located north of the main building.

In January 1986 moderate to low concentrations of CVOCs were reported for 3 monitoring wells located at the Wilson's Corner site. A groundwater remediation system for the contamination at the Wilson's Corner site was constructed and began operation in 1989. The current system is stabilizing the groundwater contamination and removing dissolved contamination. Environmental personnel at KSC noticed that the CVOC concentrations in the recovered groundwater had leveled off at concentrations above their remediation goals and decided to investigate ways to enhance the removal of CVOCs. All previous characterization studies focused on groundwater sampling and as a result there was very little information on the residual contamination in the soil and sediments beneath the Wilson's Corner site. In 1994 KSC contacted the Savannah River Technology Center (SRTC) regarding the innovative technologies that had been studied at the Integrated Demonstration Site on the Savannah River Site. Following the discussions, KSC requested SRTC to conduct a detailed study of the residual contamination at the Wilson's Corner site and to assist in identifying potential enhancements to the existing remediation system. This report presents the results of a detailed study of the residual CVOC contamination in the soil and sediment at the Wilson's Corner site.

Sampling and Analysis

An innovative method for the sampling and analysis of CVOCs (Looney et al, 1993) in soil and groundwater, that was developed by the SRTC, was used to study the residual CVOC contamination in the soil and sediment at the Wilson's Corner site. This method has subsequently been refined by others, adopted and approved by the Environmental Protection Agency (EPA) as Method 5021 (Rev. 0, January 1995).

Depth discrete bulk sediment samples were collected from 15 different locations at the Wilson's Corner site on the Kennedy Space Center during August 1996, Figure. 1, Table 1. Continuous core was collected to a depth of 50 - 55 feet at each location using steam cleaned hollow stem augers and split spoon sampling tubes. The total depth at each core location was determined by the location of the confining layer at the base of the surficial aquifer. Once the core had been removed from the ground, 2 - 3 cm^3 samples of the bulk sediment were immediately collected at 2 feet intervals and at significant lithologic changes using a modified plastic syringe and transferred to a 22.5 mL glass vials. 5 mL of deionized water was added to each vial as a suspending solution (giving a total sample volume of 7 to 8 mL) and then a Teflon lined rubber septa and aluminum crimp top were placed on the bottle. All samples were refrigerated until analysis. After the depth discrete bulk sediment samples had been collected the geologist providing technical oversight of the drilling prepared a detailed lithologic description of the core, (Appendix A)

Prior to sampling the average weight of a 22.5 mL glass vial with 5 mL of pure deionized water and a Teflon lined rubber septa and aluminum crimp top (tare) was determined. The weight of the sediment sample was determined by weighing the sealed sample bottle and subtracting the average tare weight.

Each sample was then analyzed using a Hewlett Packard (HP) 5890 gas chromatograph (GC) equipped with an electron capture detector, a flame ionization detector, an HP 19395 headspace sampler, and a 60 m widebore glass capillary column (Supelco VOCOL™). The samples are heated to 70 degrees C in the autosampler prior to injection into the GC to maximize the transfer of CVOCs into the vapor phase (Looney et al, 1993). A complete set of standards in water (7.5 mL) was run with each set of samples for calibration. This method is a slightly modified version of the newly approved EPA Method 5021 for headspace analysis of CVOCs in soil and water samples.

The headspace method is best when used on sediment samples with minimal organic carbon content. High organic carbon content can produce results with lower than actual concentrations due to increased adsorption on the organic carbon. Several core locations had sediments with high organic carbon content in the 5 to 8 feet deep range and these results should be treated as suspect.

Results

Approximately 800 feet of continuous core and 800 sediment samples were collected. Four hundred of the samples were analyzed and a duplicate set was archived for future analysis as necessary. Results of the continuous coring indicate that the surficial aquifer is composed of a sandy shell hash and a silty medium to fine grained sand. The shell hash overlies the silty sand and varies in thickness from 8 - 25 feet. Occasionally the shell hash is present in 2 layers separated by fine grained sand. The surficial aquifer was deposited in a shore zone depositional environment and as a result has well developed bedding planes. The surficial aquifer is overlain by backfill, peat, and silty sand and is underlain by a silty clay layer approximately 50 feet deep, Figure 2. The clay layer generally dips from east to west and has a local low in the center of the Wilson's Corner Site, Figure 3. On Figure 3 the color contours illustrate the structure of the top of the clay layer and the columns depict the cored locations and total sampling depth.

Trichloroethylene (TCE), cis-dichloroethylene (cDCE), vinyl chloride (VC), and Freon-113 (F113) were the primary CVOCs detected, Table 2. Breakdown products of F113 were also detected but not quantified due to a lack of calibration standards. Locations NASA3 and NASA5 had the highest concentrations of CVOCs as was expected since these locations are in the immediate vicinity of known source areas. CVOCs were present from the surface to the bottom of the surficial aquifer at NASA3 and NASA5. Figures 4 - 7 show the trichloroethylene, cis-dichloroethylene, vinyl chloride and Freon-113 profiles for 4 sampling locations, NASA1, NASA3, NASA5 and NASA6. Results from the sample analysis vary over 5 orders of magnitude and as a result the concentration is plotted on a log scale in figures 4 - 7.

Sampling locations NASA3 and NASA5 are characteristic of source areas and NASA1 and NASA6 are downgradient on the primary migration path. Trichloroethylene has migrated farther than Freon-113 has as shown by the presence of trichlorethylene in NASA 1 and NASA6 and the lack of detectable Freon-113 in the same locations.

Data from the soil analysis was compiled into a contaminant model using 3 dimensional interpolation. The interpolation was performed using earthVision a product of Dynamic Graphics Inc. EarthVision uses a 3 dimensional minimum tension gridding algorithm to interpolate 3 dimensional data sets and can incorporate a vertical influence factor and 2 dimensional surfaces to constrain the model. In the Wilson's Corner model the vertical influence factor was used to increase the weighting in the lateral direction for interpolation to simulate the effect of bedding planes on contaminant migration.

Two dimensional surfaces were prepared for the surface topography, water table, and top of the clay layer using data from the field work. The top and bottom of the contaminant model were constrained using the surface topography and top of the clay layer respectively.

The 3 dimensional migration yields a complex contamination pattern that is difficult to determine with conventional groundwater investigation methods. In Figure 8, a slice through the model reveals the pattern of contaminant migration beneath the equipment cleaning facility. The low concentrations at the bottom of the surficial aquifer beneath the source area in Figure 8 are due to contaminant removal from operation of recovery well NPSH-1. The high concentrations west of the source area in Figure 8 are in the depression in the clay layer at the base of the surficial aquifer. Note that cis-dichloroethylene and vinyl chloride have formed around the trichloroethylene in the depression and are migrating westward ahead of the trichloroethylene.

In Figure 9 you can see two primary contaminant source areas and the contamination that has resulted from downward and lateral migration. This pattern suggests that the contaminant moved downward through the porous surficial aquifer along bedding planes until it encountered the clay layer and then began to move laterally through a silty sand layer along the top of the clay layer. The lateral cross section through the model, at the base of Figure 9, reveals two areas of elevated TCE concentration just above the clay layer. The area of elevated TCE in the center of the site is the result of the migration of TCE from the sources along bedding planes and the top of the clay layer and into the depression that was shown in Figure 3. This is typical behavior of Dense Non-Aqueous Phase Liquids, (DNAPL) such as TCE. Again note that cis-dichloroethylene and vinyl chloride have formed around the trichloroethylene and are migrating westward ahead of the trichloroethylene. In addition, two aspects of the site remedial operations may enhance the pooling of contaminants in the region of the depression. First, there are no recovery wells at any depth in the vicinity of the depression to remove soluble contaminants. Second, the region is overlain by two major irrigation circuits which produce a vertical recharge gradient that may act to force or flush contaminants downward.

The trichloroethylene in the subsurface at Wilson's Corner has weathered forming cis-dichloroethylene and vinyl chloride. The weathering is the result of in-situ anaerobic biodegradation. The weathering byproducts are most concentrated in the peat layer beneath the source areas, and beneath the trichloroethylene in the depression in the clay layer. The high organic carbon content of the peat has adsorbed large amounts of trichloroethylene and produces a strong reducing environment optimal for anaerobic biodegradation producing cis-dichloroethylene and vinyl chloride. Vinyl chloride is resistant to further anaerobic biodegradation and will continue to accumulate in the subsurface unless it migrates into an aerobic environment where it can be degraded to CO2, Cl, and water.

Trichloroethylene trapped in the depression has begun to biodegrade into cis-dichloroethylene and vinyl chloride. Cis-dichloroethylene and vinyl chloride that formed at the fringes of the trichloroethylene in the depression are migrating southwestward with the ambient groundwater flow toward recovery wells NPSH5 and NPSH20. No trichloroethylene was detected in NASA6 however, both cis-dichloroethylene and vinyl chloride were detected in NASA6 indicating that the leading edge of the trichloroethylene plume is currently biodegrading faster than it is moving. This data is consistent with monitoring results for well NPSH20 which has had no detectable trichloroethylene but has had cis-dichloroethylene and vinyl chloride.

Conclusions

Sediments beneath the Wilson's Corner Site at the Kennedy Space Center contain residual trichloroethylene (TCE), cis-dichloroethylene (cDCE), vinyl chloride (VC), and Freon-113 (F113). The residual CVOCs are present in the following forms:

- Adsorbed to shallow peat layer and aquifer matrix
- Diffused into porous shell fragments and fine grained sediments
- Micro-droplets trapped in individual pore throats

Trichloroethylene moved downward beneath source areas through the porous surficial aquifer and along bedding planes until it encountered the clay layer and then began to move laterally along the top of the clay layer. Anaerobic biodegradation of trichloroethylene has produced cis-dichloroethylene and vinyl chloride along the migration path. The highest concentrations of CVOCs are immediately below the source areas and in the depression in the clay layer at the base of the surficial aquifer.

Currently the Wilson's Corner Site has a network of recovery wells operating to maintain hydraulic control of the contamination and remove contaminant mass. Future remediation enhancements should focus on improved source term remediation and optimizing natural bioremediation. Potential enhancements include:

- **Dual phase remediation of sediments in the source areas.** This would include installation of a shallow recovery well screened from 12 - 27 feet near NPSH1 and NPSH14 and pumping hard enough to lower the water table below the top of the screen. Vacuum extraction would be simultaneously performed on the shallow recovery well. Vacuum extraction will draw air downward through the contaminated peat layer and sediments and into the exposed well screen efficiently removing the volatile contaminants while the pumping will recover highly contaminated water from the most permeable zone at the Wilson's Corner Site.
- **Install a deep recovery well near sampling location NASA1.** After the dual phase remediation has been operated, a deep recovery well could be installed near NASA1 to remove the trichloroethylene that has migrated down to the base of the surficial aquifer preventing further diffusion into fine grained sediments and naturally migrating groundwater.
- **Air sparging between NPSH 5 and NPSH20.** Addition of air to the downgradient extent of the contamination would produce aerobic conditions capable of supporting biodegradation of cis-dichloroethylene and vinyl chloride.
- **Targeted excavation and on-site management through biopiles**. Limited excavation of shallow (<10 feet deep) contaminated sediments at source areas that remain after dual phase remediation could be beneficial if the waste is managed on-site through biopiling. Biopiling is a cost effective method for on-site remediation of excavated soils containing volatile and biodegradable contaminants.

References

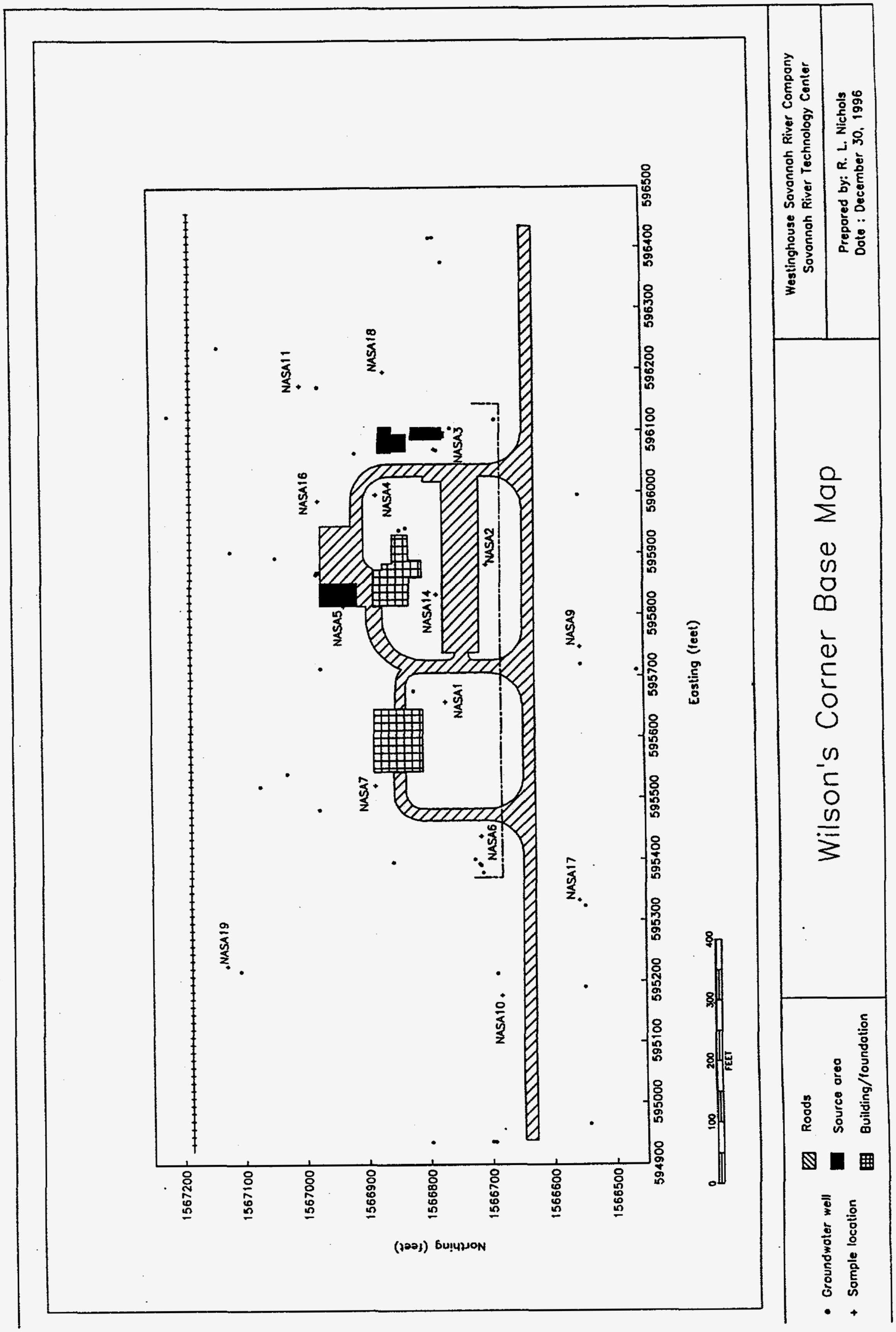
Looney, B. B., C. A. Eddy, and W. R. Sims, 1993. *Evaluation of Headspace Method for Volatile Constituents in Soils and Sediments*. I n Measuring and Interpreting VOCs in Soils: State of the Art and Research Needs, US Environmental Protection Agency, Environmental Monitoring Systems Laboratory, Las Vegas NV 89193.

Table 1 Coordinates for sample locations at the Wilson's Corner Site.

Location Id	Easting (feet)	Northing (feet)	Surf. Elev. (ft, msl)
NASA1	595,657.98	1,566,770.46	7.25
NASA2	595,881.07	1,566,703.44	8.7
NASA3	596,070.49	1,566,785.33	8.14
NASA4	595,997.15	1,566,881.07	8.16
NASA5	595,813.02	1,566,933.90	7.7
NASA6	595,436.91	1,566,715.65	6.32
NASA7	595,521.68	1,566,884.84	7.24
NASA9	595,747.67	1,566,552.52	6.97
NASA10	595,176.13	1,566,682.56	5.53
NASA11	596,173.38	1,567,003.41	9.64
NASA14	595,833.11	1,566,783.49	8.52
NASA16	595,986.54	1,566,975.14	8.44
NASA17	595,333.69	1,566,556.48	4.99
NASA18	596,195.57	1,566,867.68	8.46
NASA19	595,225.22	1,567,128.44	7.15

Table2 Summary of primary contaminants detected in bulk sediment samples at the Wilson's Corner Site.

Chlorinated Volatile Organic Compound	**Detection Limit (ug/gm)**	**Maximum (ug/gm)**	**Location of Maximum**
Trichloroethylene	0.001	19.37	NASA3, 9 feet deep
cis-Dichloroethylene	0.001	87.36	NASA5, 7 feet deep
Vinyl Chloride	0.001	6.45	NASA5, 7 feet deep
Freon 113	0.001	42.11	NASA5, 7 feet deep


Westinghouse Savannah River Company
Savannah River Technology Center
Prepared by: R. L. Nichols
Date : December 30, 1996
Wilson's Corner Base Map
Groundwater well
Sample location
Roads
Source area
Building/foundation
Easting (feet)
Northing (feet)
FEET
NASA1
NASA2
NASA3
NASA4
NASA5
NASA6
NASA7
NASA9
NASA10
NASA11
NASA14
NASA16
NASA17
NASA18
NASA19

Wilson's Corner

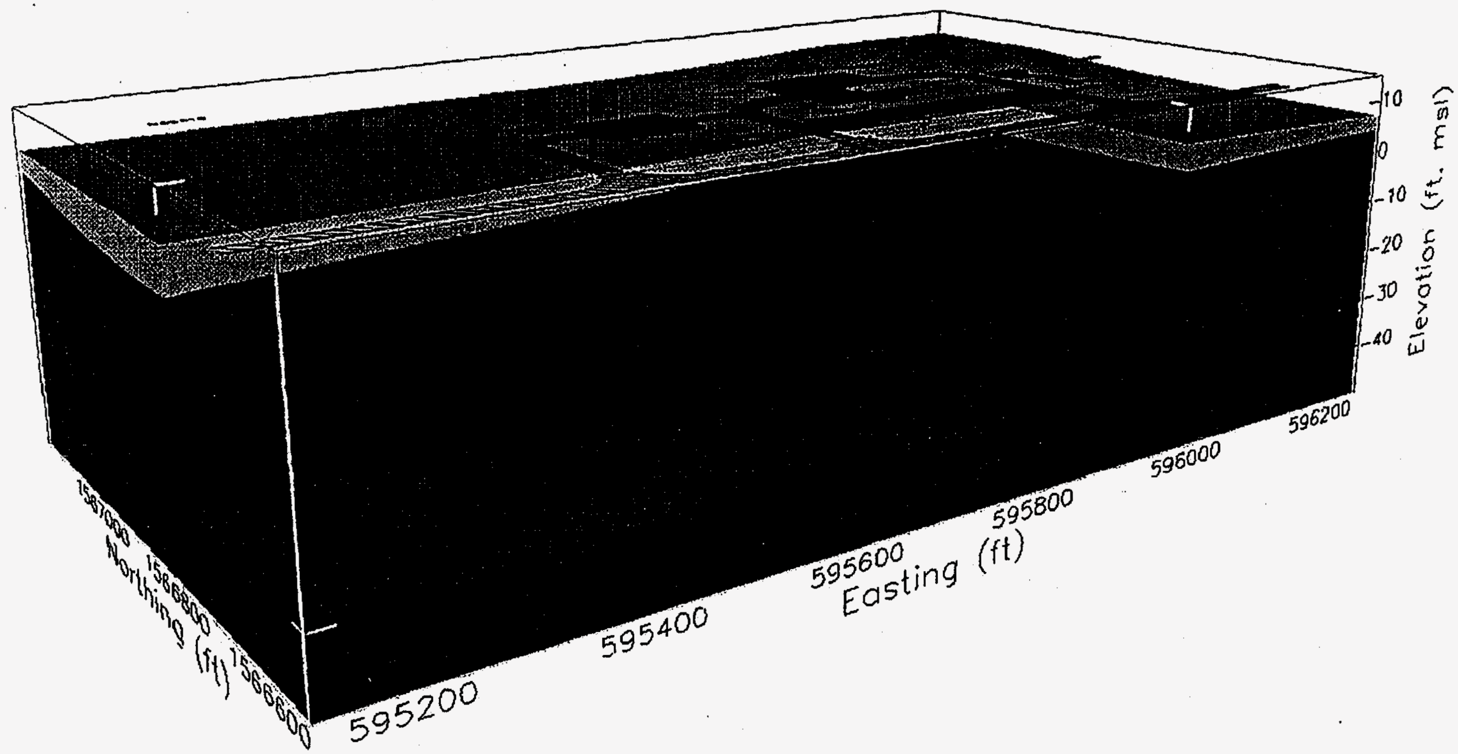


Figure 2 Conceptual model for 3 dimensional imaging of results from CVOC analysis of depth discrete sediment samples.

Wilson's Corner

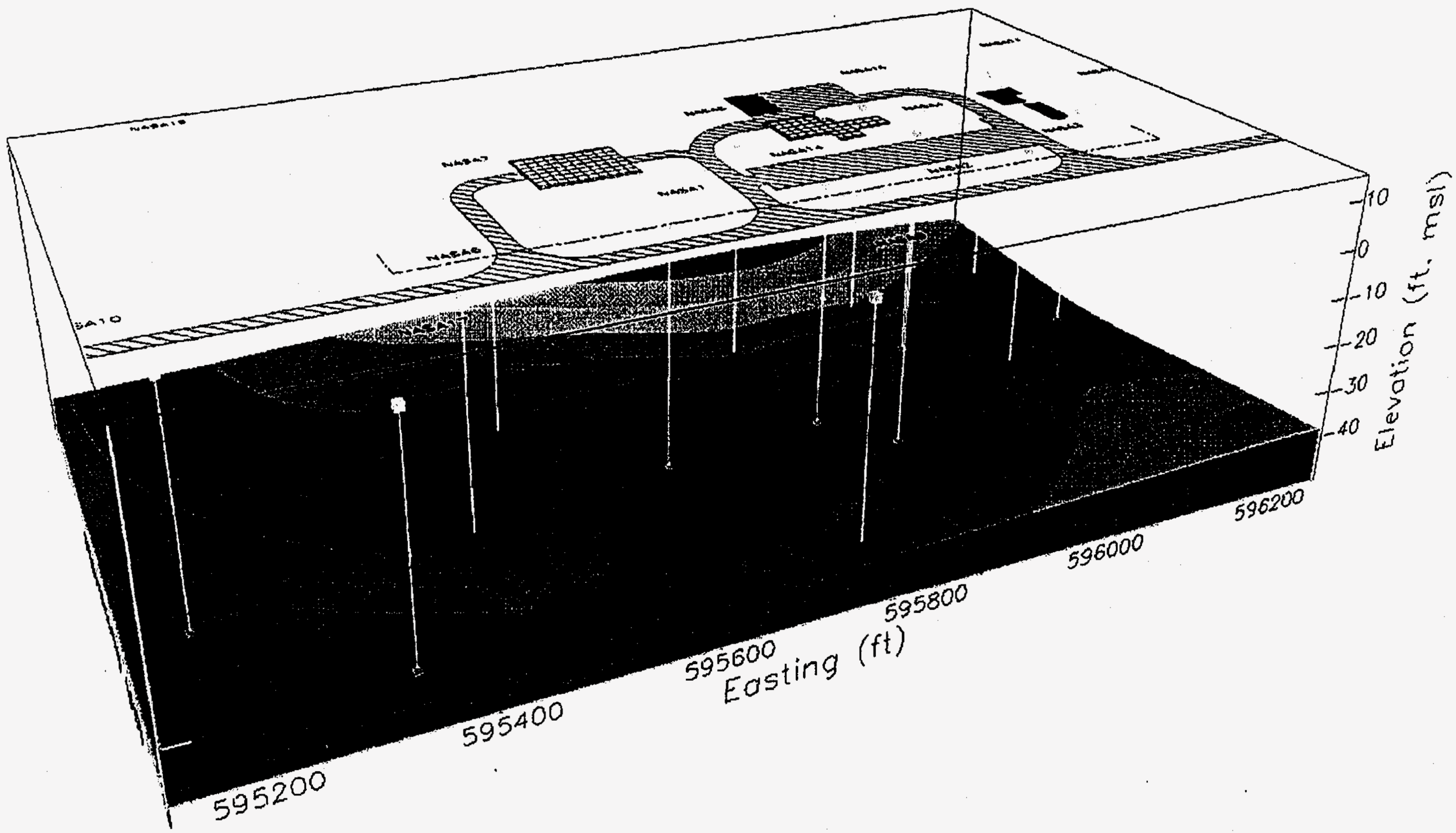


Figure 3 Structural map of the top of the confining unit at the base of the surficial aquifer.

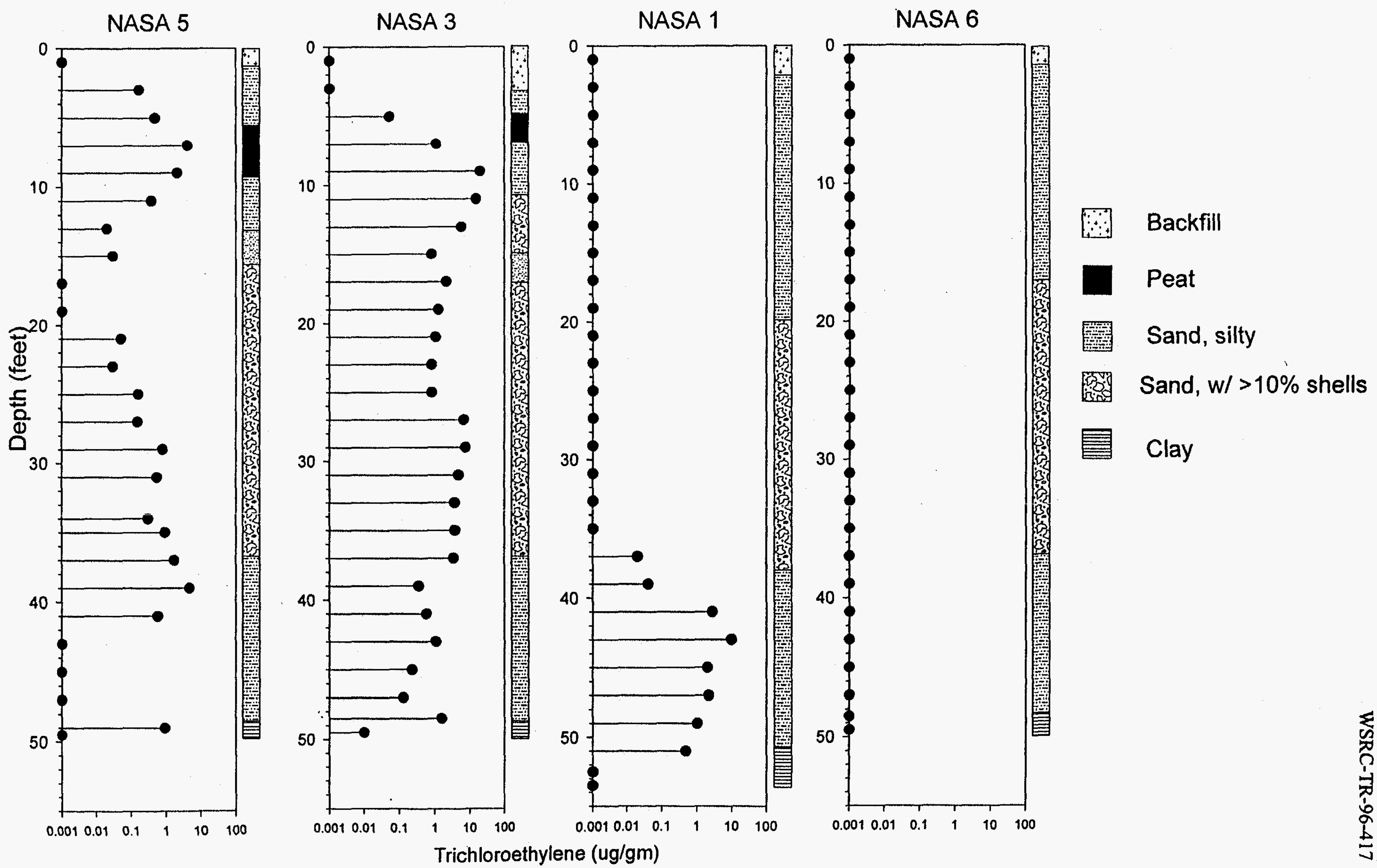


Figure 4 Trichloroethylene profiles for NASA 1, NASA3, NASA5, and NASA6 sediment sampling locations.

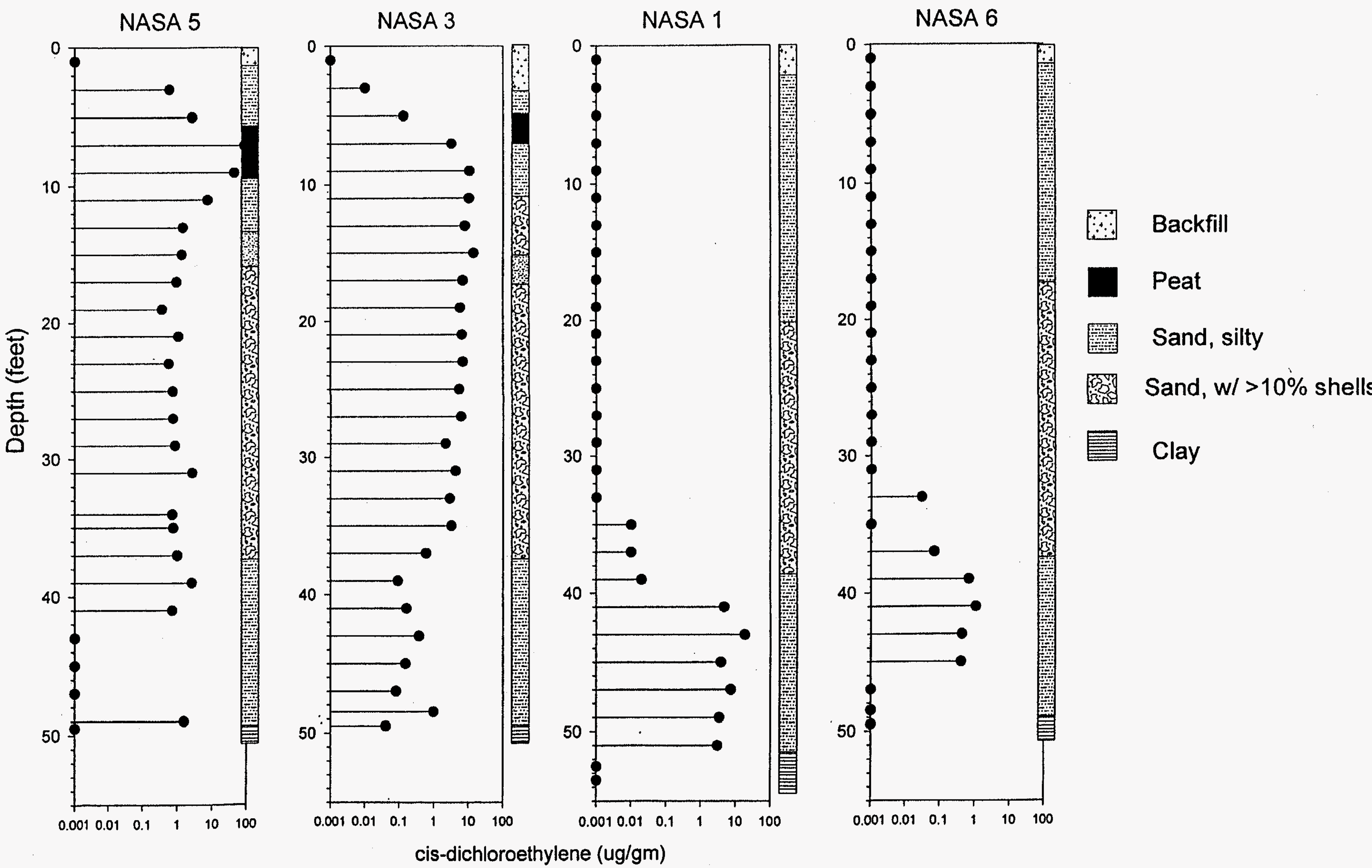


Figure 5 Cis-dichloroethylene profiles for NASA 1, NASA3, NASA5, and NASA6 sediment sampling locations.

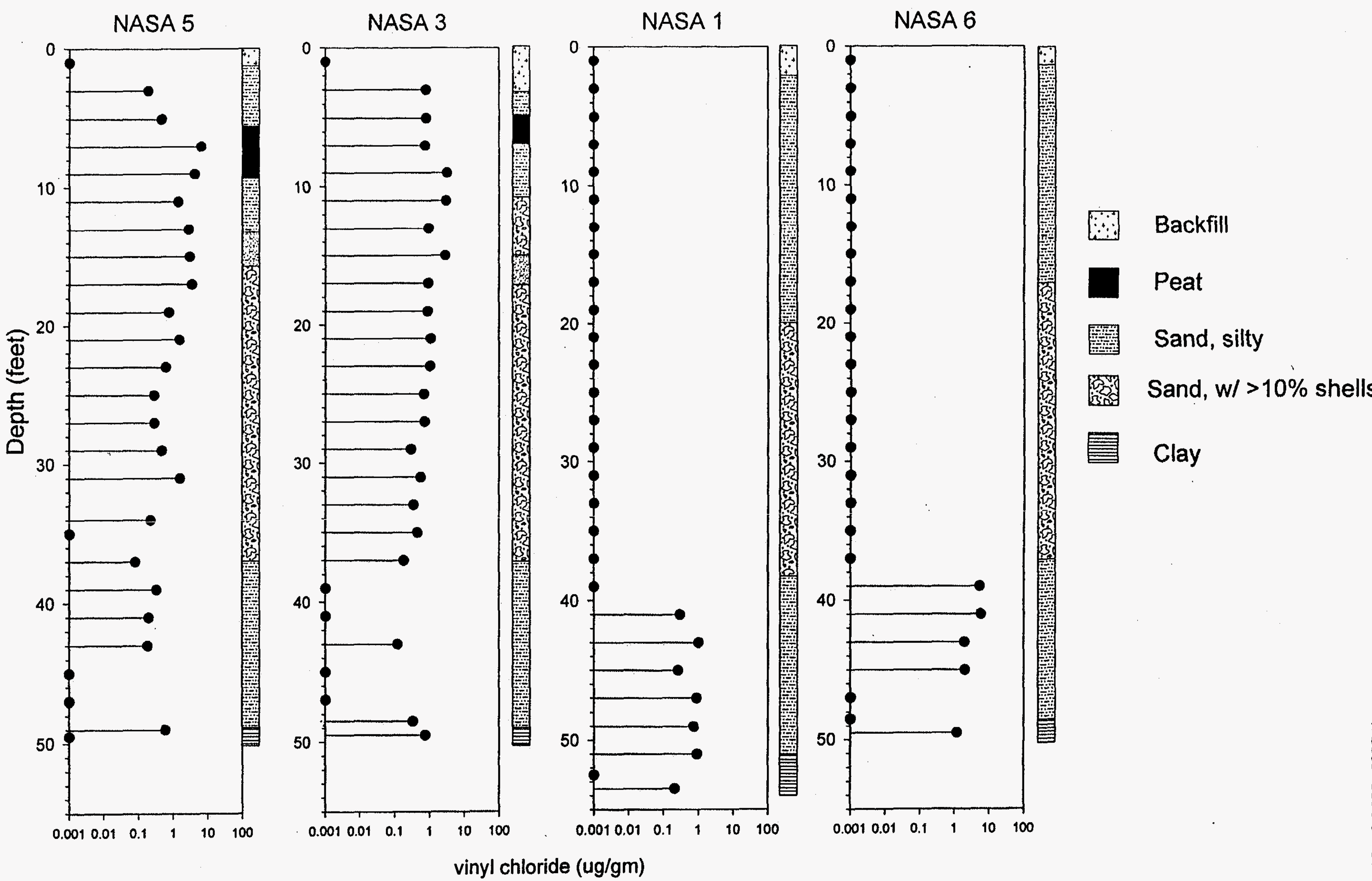


Figure 6 Vinyl chloride profiles for NASA 1, NASA3, NASA5, and NASA6 sediment sampling locations.

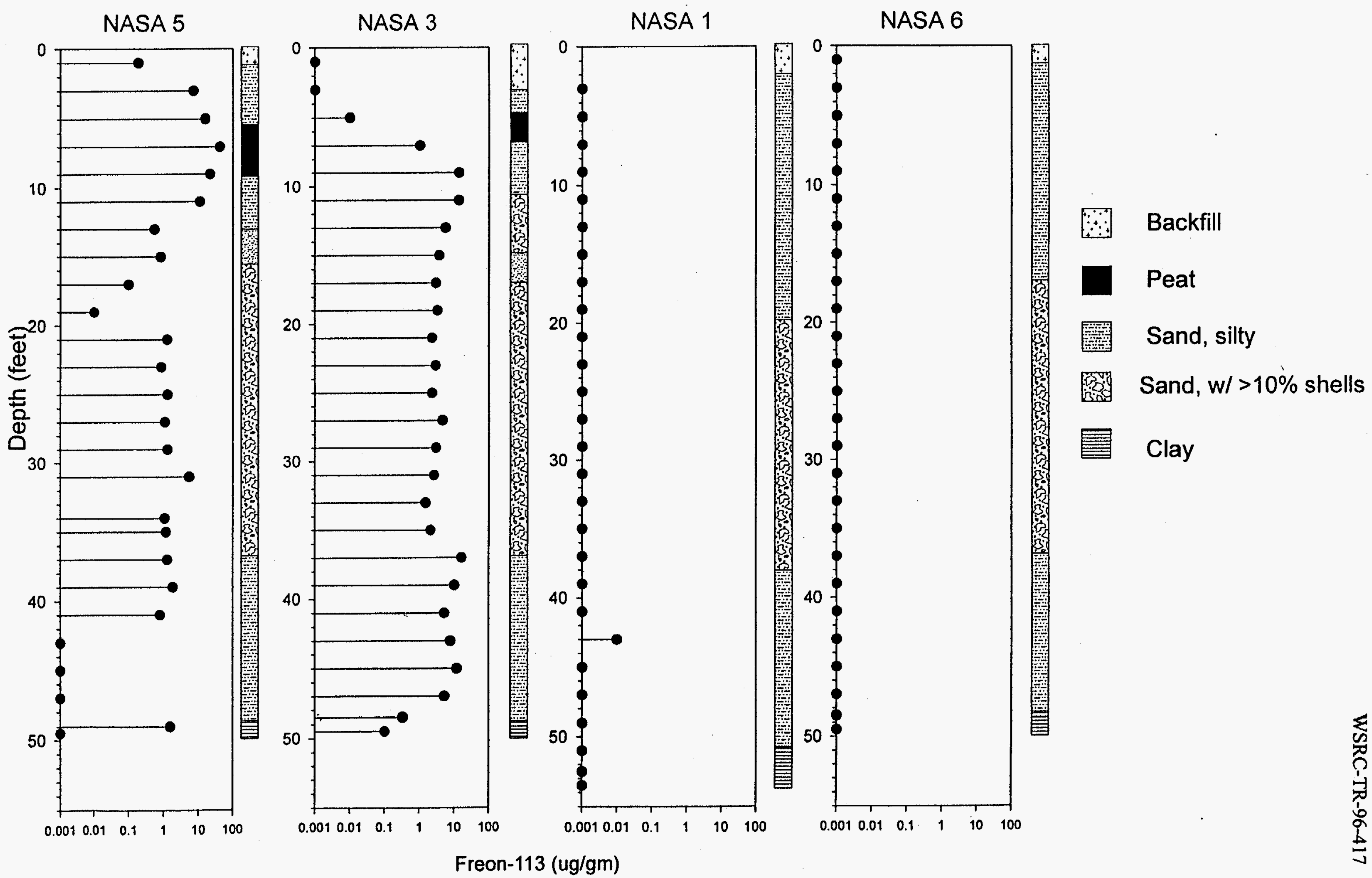


Figure 7 Freon-113 profiles for NASA 1, NASA3, NASA5, and NASA6 sediment sampling locations.

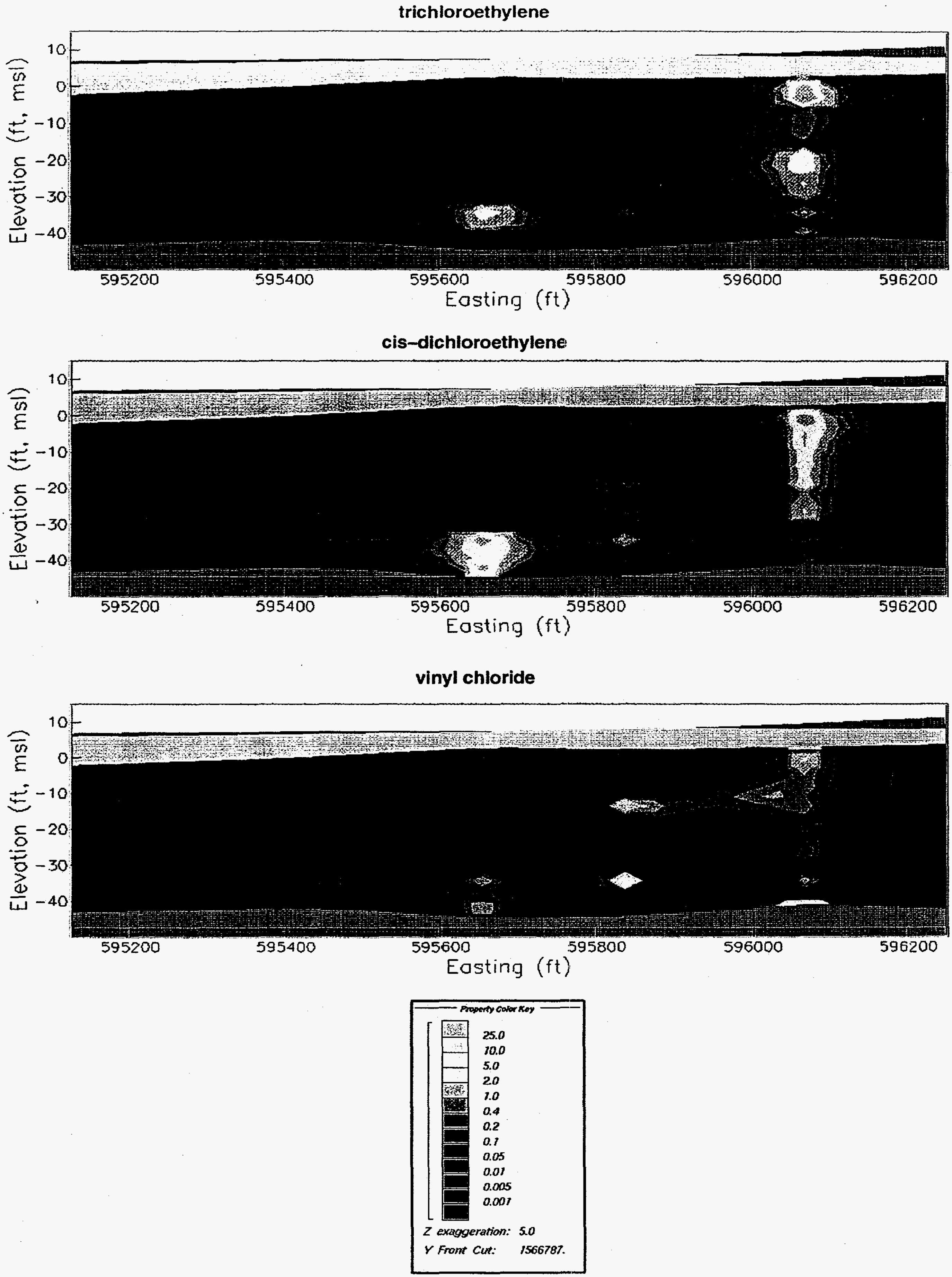


Figure 8 Cross section through 3 dimensional models of trichloroethylene, cis–dichloroethylene, and vinyl chloride results from headspace analysis of sediment samples.

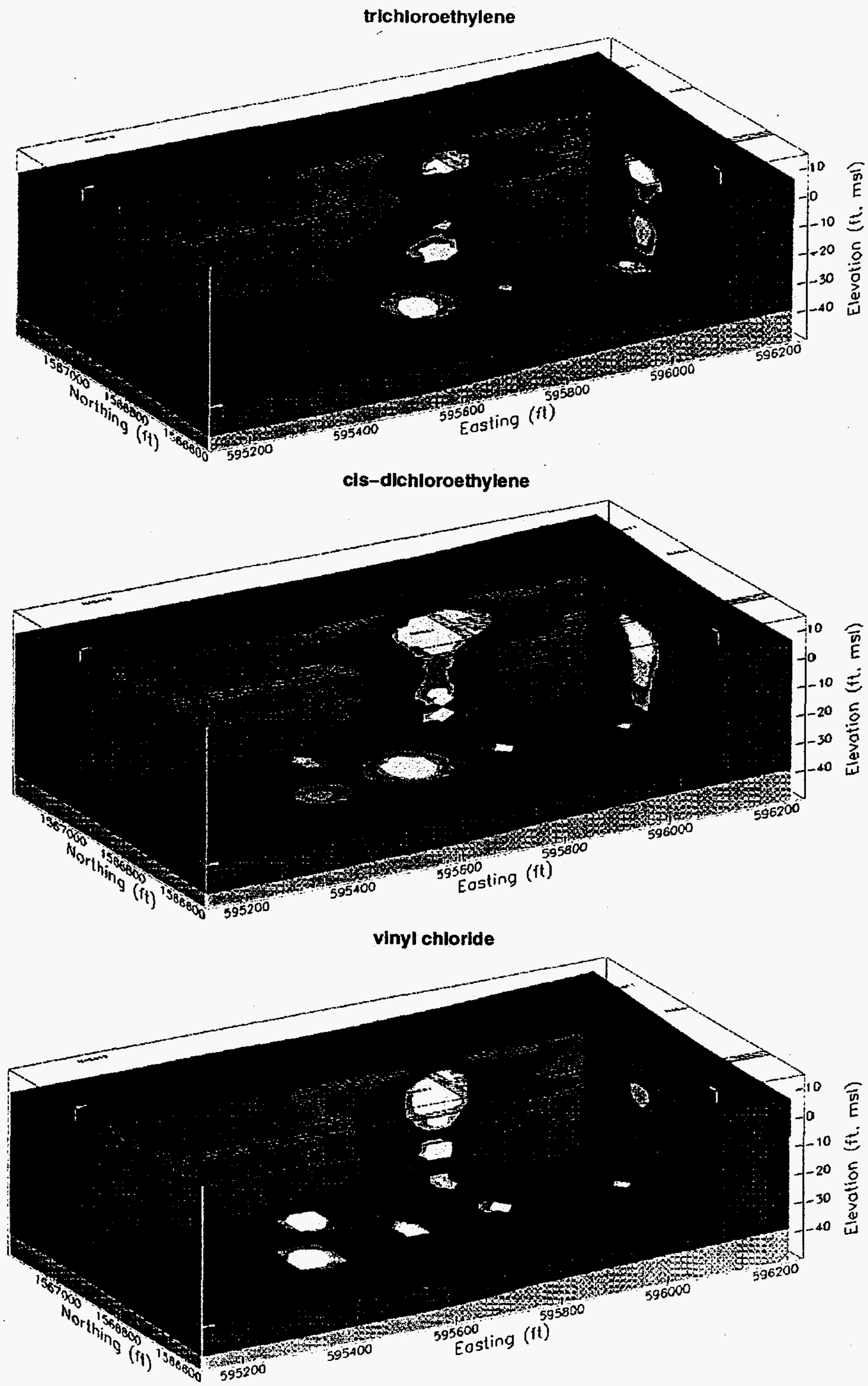


Figure 9 Three dimensional models of trichloroethylene, cis–dichloroethylene, and vinyl chloride results from headspace analysis of sediment samples showing the contaminant sources and migration along the top of the confining unit

Appendix A

Soil Boring Logs

SRS

SOIL BORING LOG

PROJECT: NASA - WILSON CORNERS		DATE: 8/22/96 AREA: —
BORING NO.: NASA - 01	SRS COORDINATES: N E	REFERENCE ELEVATION
DRILLER: ROBERT SNOW	DRILLING SUBCONTRACTOR: GEOTEK	TOTAL HOLE DEPTH: 54 ft.
TECHNICAL OVERSIGHT: JAMES WEDEKIND	GROUNDWATER DEPTHS: DATE 8/22/96, TIME 0917, DEPTH 9 ft (first encountered)	DRILLING METHODS AND DEPTHS: HOLLOW STEM AUGER
OVERSIGHT COMPANY: CDM FEDERAL		

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID (ppm)
1	SS	0	1, 2, 3, 3	24/24	100	FILL / SM	GRASS AND TOPSOIL WITH CRUSHED STONE BECOMES SAND, LIGHT GREY, SILTY, WITH ROOTS, ORGANICS	0
2	SS		1, 4, 4, 50/2	24/23	96	SM	BECOMES SAND, SILTY, GREY TO DARK GREY OR BLACK ABUNDANT ORGANICS SPOON REFUSAL - MATERIAL PACKED TIGHTLY IN SPOON	0
3	SS	5	1, 13, 16, 20	24/24	100	SM	SAND, SILTY, DARK GREY-BROWN, FINE, WELL SORTED SUBANGULAR, ABUNDANT ORGANICS, DENSE, SLIGHTLY MOIST OCCASIONAL SHELL FRAGMENTS, WHITE, COARSE	0
4	SS		7, 9, 11, 13	24/24	100	SM		0
5	SS		4, 5, 5, 6	24/24	100	SM	SAND, SILTY, BROWN, FINE, WELL SORTED, SUBANGULAR, ABUNDANT ORGANICS, LOOSE, MOIST, WITH ROOTS	0
6	SS	10	1, 2, 2, 3	24/24	100	SM	SAND, SILTY, LIGHT BROWN, BECOMES GREY, SUBANGULAR, FINE, WELL SORTED, WET WITH ROOTS, LOOSE	0
7	SS		1, 1, 1, 1	24/24	100	SM	SAND, SILTY, LIGHT BROWN OR GREY, AS ABOVE, VERY LOOSE WET - SLOUGH??	0
8	SS	15	1, WOH, WOH, WOH	24/24	100	SM	SAND, SILTY, BROWN. BECOMES GREY AS ABOVE POSSIBLY SLOUGH, WET, SATURATED DEFINITE SLOUGH	0
9	SS		3, 3, 6, 8	24/24	100	SM	SAND, SILTY, GREY, FINE, WELL SORTED MEDIUM DENSE WITH SHELLS, WHITE, COARSE, BROKEN	0
10	SS	20	7, 6, 8, 8	24/24	100	SM	- SLOUGH (50% of sample) SAND, SILTY, GREY, FINE TO VERY FINE, MEDIUM-WELL SORTED SUBANGULAR, W/ SHELLS (~3-5%), WHITE, BROKEN	0

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

SRS

SOIL BORING LOG

PROJECT NASA-01 BORING NO. NASA-01 DATE 8/22/96

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID (ppm) Above Background
		20						
11	SS		8, 8, 10, 8	24/24	100	SW	SAND (50%) AND SHELLS (50%) - GREY, FINE-COARSE, POORLY SORTED, ANGULAR-SUBANGULAR, MOIST	0
12	SS		5, 6, 6, 5	24/24	100	SP/GW	SAND (60%), LIGHT GREY, FINE, WELL SORTED, SUBANGULAR W/ SHELLS (40%), GREY-WHITE-TAN, COARSE-FINE ANGULAR, POORLY SORTED, MOIST	0
13	SS	25	3, 2, 3, 6	24/20	83	(SW) GW/SP	SHELLS (60%), VARIABLY COLORED, COARSE-FINE, POORLY SORTED, ANGULAR WITH SAND, SILTY, GREY, FINE, AS ABOVE, LOOSE	0
14	SS		5, 5, 4, 8	24/24	100	(SW)		0
15	SS		4, 4, 7, 8	24/22	83	SP/GW (SW)	SAND (55%), GREY, SLIGHTLY SILTY, FINE, WELL SORTED SUBANGULAR AND SHELL (45%), VARIABLY COLORED, COARSE-FINE, ANGULAR, POORLY SORTED, MEDIUM DENSE	0
		30						
16	SS		6, 8, 10, 11	24/23	96	SP/GW	SAND AND SHELLS, GREY, SLIGHTLY SILTY, COARSE-FINE POORLY SORTED	0
17	SS		4, 6, 7, 9	24/21	88	SP/SW GW	SAND (70-90%), LIGHT GREY, SLIGHTLY SILTY, FINE TO VERY FINE, WELL SORTED, SUBANGULAR WITH SHELLS (10-20%), VARIABLY COLORED (GREY, WHITE, TAN)	0
18	SS	35	8, 7, 10, 6	24/24	100	(SW)	COARSE-MEDIUM, POORLY SORTED, ANGULAR, MEDIUM DENSE	0
19	SS		11, 14, 17, 8	24/21	88	SM/SW	SAND, SILTY, LIGHT GREY OR TAN-GREY BECOMES BLUISH GREY, POORLY SORTED (COARSE-FINE), ANGULAR-SUBANGULAR SHELLS LOCALLY ABUNDANT (10%), SLIGHTLY CLAYEY @ 38 ft	0
20	SS		6, 6, 8	24/23	96			0
		40						
21	SS		2, 3, 4, 10	24/23	96	SM/SW	SAND, SILTY, CLAYEY, BLUISH GREY, FINE-COARSE, POORLY SORTED, ANGULAR-SUBANGULAR, W/ SHELLS, WELL PRESERVED, LOOSE, MOIST	15-20
22	SS		3, 4, 2, 5	24/22	94	SM	SAND, SILTY, CLAYEY, BLUISH GREY, FINE-VERY FINE, WELL-MEDIUM SORTED, SUBANGULAR, W/ WELL PRESERVED SHELLS (5%), VERY MOIST, LOOSE	50-300
23	SS	45	2, 3, 3, 4	24/23	96	SM		150-200
24	SS		6, 7, 6, 10	24/23	96	SM	SAND, SILTY, SLIGHTLY CLAYEY, BLUISH GREY, FINE-VERY FINE, WELL SORTED, SUBANGULAR, WITH WELL PRESERVED SHELLS (~3%), MOIST, MEDIUM DENSE	50-100
25	SS		2, 2, 3, 4	24/24	100	SM	SAND, SILTY, SLIGHTLY CLAYEY, SLIGHTLY PLASTIC, AS ABOVE, BLUE-GREY W/ SHELLS, MOIST, LOOSE	10-30
		50						

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS
SAVANNAH RIVER SITE

SOIL BORING LOG

PROJECT NASA Wilson Corners BORING NO. NASA-01 DATE 8/22/96

SAMPLING NO.	SAMPLING TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID (ppm)
		50	1					
26	SS		3	24/24	100	SM	BLUE-GREY SAND, SILTY, SLIGHTLY CLAYEY, FINE-VERY FINE, SUBANGULAR,	7-20
			6				WELL SORTED, FEW SHELLS, LOOSE, MOIST	
			9					
			6					0
27	SS		7	24/24	100	CL/MH	CLAY, SILTY, SANDY, PLASTIC, WITH SHELLS, OFTEN LAMINATED	0
			11					
			12				INTERBEDDED WITH SANDY CLAY AND LARGE SHELLS AND SHELL HASH LAYERS	
		55						
							TOTAL DEPTH @ 54 ft.	
		0						
		5						
		0						
		5						
		0						

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

SRS

SOIL BORING LOG

PROJECT NASA Wilsons Corner, FL		DATE 8/13/96 AREA
BORING NO. NASA 02	~~SRS~~ COORDINATES N E	REFERENCE ELEVATION
DRILLER Robert Snow	DRILLING SUBCONTRACTOR Geotek	TOTAL HOLE DEPTH 54 ft.
TECHNICAL OVERSIGHT James Wedekind OVERSIGHT COMPANY CDM Federal	GROUNDWATER DEPTHS DATE 8/13/96 TIME 1425 DEPTH ~8 ft	DRILLING METHODS AND DEPTHS HSA w/ continuous split spoons

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION
		0					GRASS AND LIMEROCK (FILL) AND TOPSOIL, SANDY, BLACK
1	SS		2, 4, 4, 5	24/19	75	SM	SAND, SILTY, DARK GREY, SUBANGULAR, MODERATELY WELL SORTED, MOIST, TRACE ORGANICS, FINE GRAINED
2	SS		10, 7, 8, 7	24/18	75	SM	SAND SILTY, GREY FINE GRAINED, SUBANGULAR, WELL SORTED MOIST, WITH ORGANICS. BECOMES BROWN, SILTY, MEDIUM DENSE
3	SS	5	5, 8, 11, 15	24/24	100	SM	SAND, AS ABOVE, W/ SHELL FRAGS AND ROOTS
						PT	SAND, DARK BROWN TO BLACK, SILTY, VERY FINE GRAINED, SUBANGULAR, VERY ORGANIC, PEAT-RICH, WOOD FRAGS MOIST
4	SS		9, 10, 13, 18	24/24	100	SM	SAND, SILTY, GREY TO BROWNISH BLACK, VERY FINE GRAINED, SUBANGULAR, W/ SHELL FRAGMENTS, PEAT, DENSE
5	SS		7, 5, 9, 3	0/24	0	NR	NO RECOVERY
6	SS	10	1, 1, 1, 1	10/24	40	SM	SAND, SILTY, BROWN, WET - POSSIBLY SLOUGH, VERY SOFT
7	SS		2, 1, 1, 2	24/24	100	SM	SAND, BROWN W/ BLACKISH MOTTLING, VERY FINE GRAINED SUBANGULAR, WELL SORTED EXCEPT FOR OCCASIONAL SHELL FRAGMENTS, LOOSE, WET
8	SS	15	5, 7, 8, 10	24/24	100	SP/SM	SAND, GREY, SLIGHTLY SILTY, FINE TO MEDIUM GRAINED, MODERATELY SORTED, SUBANGULAR, ABUNDANT SHELL FRAGS.
9	SS		6, 12, 17, 20	21/24	90	SM/SP	SAND, GREY, SLIGHTLY SILTY, FINE TO COARSE GRAINED, POORLY SORTED, SUBANGULAR, SHELL INTERVAL @ 18 ft.
10	SS	20	5, 12, 10, 9	24/24	100	SM	SAND, GREY, SLIGHTLY SILTY, SHELLY, AS ABOVE

750 ppm

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS

SOIL BORING LOG

PAGE 2 OF 3

PROJECT NASA- WILSON'S CORNER BORING NO. NASA 02 DATE 8/13/96

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	
		20						
11	SS		7, 7, 8, 7	24/24	100	SM/SC	SAND, SILTY, GREY, MEDIUM/COARSE GRAINED, SUBANGULAR POORLY SORTED, VERY ABUNDANT SHELL FRAGMENTS MEDIUM DENSE	
12	SS		10, 12, 13, 18	24/24	100	SP	SAND SILTY, GREY, MEDIUM/COARSE GRAINED, SUBANGULAR POORLY SORTED, VERY ABUNDANT SHELLS (~70%), DENSE	
13	SS	25	12, 15, 16, 17	24/21	50 (SLOUGH)	SP	SAND, SILTY GREY, COARSE GRAINED (~90% SHELLS) AS ABOVE	8/13 STOP WORK F[OR] DAY
14	SS		5, 6, 8, 10	24/22	90	SP/GP	SAND, SILTY, GREY, COARSE GRAINED, SUBANGULAR, MODERATELY SORTED, VERY ABUNDANT SHELLS (90%)	8/14
15	SS	30	8, 11, 9, 13	24/24	100	SP/GP	SAND, VERY SLIGHTLY SILTY, LIGHT BROWN/GREY SUBANGULAR COARSE-FINE GRAINED, POORLY SORTED, ABUNDANT SHELLS (70-100%)	
16	SS		10, 13, 16, 18	24/24	100	SP	SAND, SLIGHTLY SILTY, GREY, FINE GRAINED, SUBANGULAR, WELL SORTED, RARE SHELL FRAGMENTS, DENSE	
17	SS		19, 22, 18, 17	24/24	100		SAND, LIGHT GREY, SLIGHTLY SILTY, FINE-COARSE GRAINED, SUBANGULAR, POORLY SORTED, LOCALLY SHELLY (10-90%)	
18	SS	35	12, 16, 18, 26	24/24	100	SP	SAND, SLIGHTLY SILTY, FINE-COARSE GRAINED, SUBANGULAR, POORLY SORTED, SHELLY (20-80%) - GREY	
19	SS		5, 7, 8, 9	24/24	100	SM	SAND SILTY VERY SLIGHTLY CLAYEY, FINE GRAINED - GREY WELL SORTED, SUBANGULAR, FEW SHELLS, MEDIUM DENSE	
20	SS	40	4, 5, 6, 5	24/24	100	SM/SC	SAND, SILTY, CLAYEY, MEDIUM GREY, MEDIUM GRAINED, SUBANGULAR POORLY SORTED, OCCASIONALLY SHELLY, LOOSE	
21	SS		5, 7, 9, 10	24/24	100	SP/GP	SAND, SLIGHTLY SILTY, GREY, COARSE GRAINED, SUBANGULAR POORLY SORTED, ABUNDANT SHELLS (60%), SLIGHTLY CLAYEY AT 42'11	
22	SS		9, 11, 10, 13	23/29	95	SM/SC	SAND, SILTY, SLIGHTLY CLAYEY, GREY TO BLUE GREY, FINE GRAINED WITH OCCASIONAL SHELL FRAGMENTS, MODERATELY SORTED SUBANGULAR, MEDIUM DENSE	
23	SS	45	5, 7, 12, 14	24/24	100	SM/SC	SAND, AS ABOVE	
24	SS		13, 7, 9, 7	29/23	97	SM/SC	SAND, SILTY, SLIGHTLY CLAYEY, BLUE GREY, FINE GRAINED, MEDIUM SORTED SUBANGULAR, W/ SHELLS (30%)	
25	SS	50	5, 4, 4, 5	24/23	97	SM/SC	SAND, SILTY, SLIGHTLY CLAYEY, AS ABOVE	

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

SRS
SAVANNAH RIVER SITE

SOIL BORING LOG

PROJECT NASA - WILSON'S CORNER | BORING NO. NASA-02 | DATE 8/14/96

SAMPLING NO.	SAMPLING TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION
		50	1			SM	SAND, SILTY, SLIGHTLY CLAYEY, BLUE GREY, SUBANGULAR,
26	SS		1	24/24	100		POORLY SORTED, WITH SHELLS (10-20%)
			4				
			7				
			3			SC/ML	SAND, CLAYEY, SILTY, BLUE GREY, SUBANGULAR, ~~WELL~~ MEDIUM SORTING, FEW SHELLS
27	SS		4	24/22			
			4				
			5		90	CL/ML	CLAY, SILTY, BLUE GREY, STIFF, VERY SLIGHTLY MOIST, PLASTIC
							FEW SHELLS - Gradational contact over ~3 ft
		55					TD @ 54 ft
		0					
		5					
		0					
		5					
		0					

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS

SOIL BORING LOG

PAGE 1 OF 2

PROJECT NASA WILSON CORNERS		DATE 8/20/96
		AREA —
BORING NO. NASA-03	SRS COORDINATES N E	REFERENCE ELEVATION
DRILLER Robert Snow	DRILLING SUBCONTRACTOR Geotek	TOTAL HOLE DEPTH 50 ft
TECHNICAL OVERSIGHT James Wedekind	GROUNDWATER DEPTHS DATE TIME DEPTH	DRILLING METHODS AND DEPTHS Hollow Stem Auger w/ Bentonite Mud
OVERSIGHT COMPANY CDM Federal		

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION
		0					
1	SS		1, 3, 3, 4	24/24	100	FILL	GRASS AND TOPSOIL, THEN COARSE AGGREGATE (LIMEROCK) (FILL)
							PEATY OR TOPSOIL, BLACK, SILTY, WITH SHELLS (FILL?)
2	SS		3, 4, 4, 5	24/24	100	PT (FILL) / SM	SAND, SILTY, BLACK TO LIGHT GREY, FINE, SUBANGULAR, WELL SORTED, WITH ORGANICS, WOOD, ROOTS
3	SS	5	13, 5, 13, 19	24/24	100	PT	OW PEAT, SANDY, VERY SILTY, DARK BROWN, MOIST, WITH ROOTS, SULFUR ODOR, STIFF
4	SS		7, 9, 8, 8	24/24	100	SM	SAND, VERY SILTY, BLACK TO DARK BROWN, FINE, SUBANGULAR, MEDIUM-WELL SORTED, ABUNDANT ORGANICS, SOME ROOTS SLIGHTLY MOIST, MEDIUM DENSE
5	SS		4, 6, 8, 7	24/24	100		SAND, SILTY, BROWN, FINE, SUBANGULAR, WELL SORTED, SLIGHT ORGANICS, MEDIUM DENSE, WET
		10					
6	SS		6, 9, 10, 11	24/24	100	GW/SP	SHELLS (60%), LIGHT GREY, COARSE-MEDIUM, MEDIUM-POORLY SORTED, ANGULAR WITH SAND (40%) FINE, GREY, WELL SORTED, SLIGHTLY SILTY, MEDIUM DENSE, MOIST
7	SS		5, 11, 11, 12	24/24	100	SP/GW	SAND (70%) LIGHT GREY, FINE, SLIGHTLY SILTY, MEDIUM-WELL SORTED W/ SHELLS (30%), MEDIUM-COARSE, MEDIUM SORTED ANGULAR, MOIST
8	SS	15	7, 9, 10, 11	24/23	96		SAND, SILTY, GREY, AS ABOVE EXCEPT WET WITH FEW SHELLS
9	SS		9, 10, 12, 13	24/23	96	GW	SHELLS (70%), VARIABLY COLORED (GREY, WHITE, BLACK, TAN) COARSE-MEDIUM, POORLY SORTED, ANGULAR, WITH SAND (30%), GREY, FINE, WELL SORTED, SUBANGULAR,
10	SS		6, 8, 10, 13	24/24	100	GW	QUARTZOSE WITH OPAQUE MINERALS (<2%)
		20					

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS
SAVANNAH RIVER SITE

SOIL BORING LOG

PAGE 2 OF 2

PROJECT NASA Wilson Corners BORING NO. NASA-03 DATE 8/20/96

NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID (ppm)
11	SS	20	8, 9, 11, 10	24/24	100	SP/GW	(50%) SAND, SLIGHTLY SILTY, GREY, FINE, SUBANGULAR, WELL SORTED WITH SHELLS (50%), VARIABLY COLORED, COARSE-FINE GRAINED ANGULAR, POORLY SORTED, MOIST-WET	100-200
12	SS		6, 7, 8, 10	24/24	100	(SW)		100-150
13	SS	25	6, 7, 9, 11	24/24	~~100~~ 85	GW/SP	SHELLS (50%), SANDY, VARIABLY COLORED, COARSE-FINE, ANGULAR, POORLY SORTED, MOIST	80-150
14	SS		8, 12, 12, 11	24/20	85	GW/SP	SAND (50%), GREY, FINE, SLIGHTLY SILTY, AS ABOVE, MEDIUM DENSE	100-200
15	SS		9, 10, 13, 12	24/24	100	SP/GW	SAND (60%), GREY, FINE, SLIGHTLY SILTY, SUBANGULAR, WELL SORTED, WITH SHELLS (40%) GREY, WHITE, BLACK, ANGULAR, POORLY SORTED COARSE-FINE, MEDIUM DENSE, MOIST	200-300
		30						
16	SS		7, 9, 11, 13	24/24	100	SP/GW	SAND, SHELLY, GREY, FINE AS ABOVE, WITH COARSE-FINE SHELLS	100-150
17	SS		7, 9, 11, 13	24/18	70	SP/GW	SAND (60%), GREY, FINE, SLIGHTLY SILTY, SUBANGULAR WELL SORTED, QUARTZOSE w/ OPAQUE MINERALS SHELLS (40%) VARIABLY COLORED, PREDOMINATELY GREY, COARSE-FINE, POORLY SORTED, ANGULAR, MEDIUM DENSE	100-200
18	SS	35	7, 11, 13, 16	24/24	100	(SW)		130-200
19	SS		8, 13, 16, 17	24/24	100	SP/SM	SAND (90%), GREY OR BLUISH GREY, FINE & VERY FINE, SLIGHTLY SILTY TO SILTY, SUBANGULAR, MEDIUM-WELL SORTED WITH SHELLS (10%) MEDIUM TO COARSE, ANGULAR, POORLY SORTED, MEDIUM DENSE, TRACE CLAY	5-10
20	SS		4, 7, 5, 7	24/24	100			3-5
		40						
21	SS		11, 11, 11, 17	24/24	100	SM/SP	SAND (80%), GREENISH-BLUE GREY, FINE TO VERY FINE, SILTY, WELL SORTED, SUBANGULAR, WITH SHELLS BROKEN, ANGULAR, COARSE-MEDIUM	3-5
22	SS		6, 9, 11, 10	24/24	100	SM/SP	SAND (90%), SILTY, GREENISH GREY, FINE TO VERY FINE, SUBANGULAR, WELL SORTED, FEW SHELLS, SLIGHTLY PLASTIC, MEDIUM DENSE	0-20
23	SS	45	7, 9, 10, 12	24/24	100	SM	SAND, SILTY, SLIGHTLY CLAYEY, FINE TO VERY FINE, BLUISH GREY, SUBANGULAR, WELL SORTED WITH OCCASIONAL SHELLS, COARSE, WELL PRESERVED, MEDIUM DENSE	1-2
24	SS		8, 7, 5, 9	24/24	100	SM		1-4 (10-15 @ 48' in shells)
25	SS	50	2, 3, 3, 4	24/24	100	ML/CL	CLAY, SILTY, SLIGHTLY SANDY, FIRM w/ OCCASIONAL SHELLS	0 ppm

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS

SOIL BORING LOG

PROJECT: NASA - WILSON CORNERS	DATE: 8/14/96
	AREA: 44501

BORING NO.	~~SRS~~ COORDINATES	REFERENCE ELEVATION
NASA - 04	N E	
DRILLER	**DRILLING SUBCONTRACTOR**	**TOTAL HOLE DEPTH**
Robert Snow	GEOTEK	52 ft.
TECHNICAL OVERSIGHT	**GROUNDWATER DEPTHS** (DATE / TIME / DEPTH)	**DRILLING METHODS AND DEPTHS**
James Wedekind	8/14/96 / 1650 / 7 ft	HOLLOW STEM AUGER W/ BENTONITE MUD
OVERSIGHT COMPANY		
CDM Federal Programs		

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION
		0					
1	SS		3, 6, 6, 7	24/18	75	FILL	GRASS, TOPSOIL AND CRUSHED STONE (FILL) TO 1.0 BECOMES SILT, BROWN, SANDY WITH CRUSHED STONE (FILL)
						ML	SILT, DARK BROWN, SANDY, CLAYEY WITH ROOTS, TOPSOIL AND ORGANIC MATERIAL - STIFF
2	SS		7, 8, 9, 12	24/23	96	SM	SAND, GREY, SILTY, FINE, WELL SORTED, SUBANGULAR, WITH ROOTS AND MOTTLING. GRADES TO PEAT, DENSE
3	SS	5	16, 18, 17, 20	24/23	96	PT	PEAT, SANDY, SILTY, DARK BROWN TO BLACKISH BROWN WITH ROOTS. BECOMES BROWN SILTY SAND, DRY, DENSE
4	SS		4, 6, 7, 10	24/18	75	PT / SM	SAND, BROWN, SILTY, FINE - MEDIUM, SUBANGULAR MEDIUM SORTED, ABUNDANT ORGANICS, WET MEDIUM DENSE
5	SS	10	4, 3, 7, 5	24/24	100		SAND, BROWN, SILTY, FINE GRAINED, AS ABOVE, LOOSE
6	SS		7, 9, 13, 16	24/24	100	GP/GM	SHELLS, SANDY GREY TO LIGHT GREY, COARSE TO MEDIUM HIGHLY BROKEN, MEDIUM SORTED, MEDIUM DENSE
7	SS		16, 14, 16, 7	24/24	100		SAND, GREY, FINE, SUBANGULAR, WELL SORTED QUARTZOSE WITH OPAQUE MINERALS (5%)
8	SS	15	11, 11, 15, 20	24/18	75	SM/SP	SAND, GREY, SLIGHTLY SILTY, FINE, SUBANGULAR, MEDIUM SORTED, WITH SHELLS (10%) DENSE
9	SS		13, 15, 18, 21	24/24	100		SAND, GREY, SLIGHTLY SILTY FINE, SUBANGULAR MEDIUM SORTED, AS ABOVE W/ SHELLS, MEDIUM DENSE
10	SS	20	13, 16, 18, 18	24/24	100	SP	SAND, FINE GRAINED, GREEN GREY, VERY SLIGHTLY SILTY, SUBANGULAR, MEDIUM SORTED WITH SHELL HASH (50%) DENSE

8/14
8/15

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS

SAVANNAH RIVER SITE

SOIL BORING LOG

PAGE 2 OF 3

PROJECT WILSON CORNERS | BORING NO. NASA-04 | DATE 8/15/96

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION
11	SS	20	10, 12, 13, 15	24/24	100	GP	SHELLS, SANDY LIGHT GREY, SUBANGULAR, MODERATELY SORTED, SHELL HASH DENSE
12	SS		17, 13, 14, 7	24/24	100	SP/SM	SAND, SLIGHTLY SILTY, GREY, SUBANGULAR, MEDIUM SORTING, FINE - COARSE GRAINED W/ SHELLS (40%), DENSE
13	SS	25	7, 9, 9, 12	24/12	50	GP	SHELLS, SANDY, GREY, SUBANGULAR, WELL SORTED, COARSE GRAINED. (40% sand), DENSE
14	SS		12, 10, 14, 17	24/24	100	GP	SHELLS, SANDY, GREY, SUBANGULAR, WELLSORTED, COARSE GRAINED, DENSE
15	SS		18, 11, 16, 22	24/24	100	GP/SM	SHELLS (50%) and SAND SUBANGULAR, POORLY SORTED, COARSE-FINE GRAINED, DENSE, SLIGHTLY SILTY
16	SS	30	10, 9, 11, 12	24/24	100	GP/SW	SHELLS (50%) and SAND: SHELLS. ~~SUB~~ MEDIUM-COARSE GRAINED, SUBANGULAR, SAND FINE GRAINED, SUBANGULAR, SLIGHTLY SILTY
17	SS		8, 11, 12, 12	24/24	100	SP	SAND (70%) GREY ~~COARSE~~-FINE GRAINED SUBANGULAR, MEDIUM SORTED, ~~SLIGHTLY~~ SILTY, W/ SHELL, COARSE-MEDIUM GRAINED.
18	SS	35	4, 7, 11, 11	24/24	100	GP	SHELLS (60%) and SAND, GREY, SLIGHTLY SILTY, COARSE-MEDIUM GRAINED, SUBANGULAR, POORLY SORTED. SAND IS FINE GRAINED, AS ABOVE SHELLS (80%) AS ABOVE
19	SS		11, 16, 15, 16	24/24	100	SP	SAND GREY, FINE GRAINED, SILTY, SUBANGULAR, WELL SORTED FEW SHELLS, DENSE
20	SS	40	14, 16, 15, 16	24/24	100	SP	SAND, GREY, FINE GRAINED, SILTY, SUBANGULAR, WELL SORTED W/ SHELLS (20%)
21	SS		11, 8, 7, 6	24/24	100	SP/SM	SAND, BLUE-GREY, FINE GRAINED, SILTY, SUBANGULAR, WELL SORTED, FEW SHELLS, MEDIUM DENSE
22	SS		5, 4, 6, 9	24/24	100	SP/SM	SAND, BLUE-GREY, AS ABOVE (10% shells)
23	SS	45	10, 8, 6, 9	24/24	100	SM/SP	SAND, Slightly silty, VERY SLIGHTLY CLAYEY, BLUE-GREY, FINE GRAINED, WELL SORTED FEW SHELLS, MEDIUM DENSE
24	SS		4, 5, 10, 11	23/24	95	SM	SAND, SILTY, VERY SLIGHTLY CLAYEY, BLUE-GREY, AS ABOVE
25	SS	50	7, 8, 9, 11	24/24	100	SM/SP	SAND, FINE GRAINED, BLUE GRAY, WELL SORTED, SUBANGULAR WITH SHELLS (10-50%) WELL PRESERVED

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS

SOIL BORING LOG

PAGE 3 OF 3

PROJECT NASA - WILSON CORNERS　BORING NO. NASA 04　DATE 8/15/96

SAMPLING NO.	SAMPLING TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION
		50	4			SM	
2C	SS		3	24/23	95	CL	CLAY, SILTY, SANDY, BLUE GREY, FIRM, W/SHELLS,
			3				BLOCKY, PLASTIC
			4				TD @ 52 ft.
		55					
		0					
		5					
		0					
		5					
		0					

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS
SAVANNAH RIVER SITE

SOIL BORING LOG

PAGE 1 OF 2

PROJECT NASA Wilsons Corner, FL		DATE 8/16/96 AREA
BORING NO. NASA ~~05~~ gw 05	SRS COORDINATES N E	REFERENCE ELEVATION
DRILLER Robert Snow	DRILLING SUBCONTRACTOR Geotek	TOTAL HOLE DEPTH 50 ft
TECHNICAL OVERSIGHT James Wedekind OVERSIGHT COMPANY CDM Federal	GROUNDWATER DEPTHS DATE 8/16/96 TIME 0800 DEPTH ~6'	DRILLING METHODS AND DEPTHS HSA with Bentonite Mud

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION
1	SS	0	2, 2, 2, 2	24/18	75	SM	GRASS AND TOPSOIL, DARK BROWN, WITH SOME CRUSHED STONE (FILL) SAND, SILTY, GREY AND DARK GREY, FINE, SUBANGULAR MEDIUM SORTING, WITH ROOTS, LAMINATED
2	SS		2, 3, 3, 2	24/18	75		SAND, SILTY, GREY, FINE, SUBANGULAR MEDIUM SORTING, MOTTLED, w/ ROOTS, MOIST
3	SS	5	2, 3, 2, 3	24/20	80		SAND, SILTY, GREY MOIST AS ABOVE
4	SS		7, 10, 13, 18	24/22	85	PEAT	PEAT, SILTY SANDY, DARK BROWN, DRY, BECOMES WET AT BASE, STIFF
5	SS	10	3, 3, 3, 3	24/22	91		
6	SS		1, 1, 1, 2	24/24	100	SM	SAND, SILTY, BROWN, FINE-MEDIUM, SUBANGULAR, MEDIUM WELL SORTED, ORGANICS, WET, VERY LOOSE
7	SS		1, 1, 1, 1	24/24	100	SM	SAND, SILTY, BROWN GRADES TO GREENISH GREY w/ SHELLS (5%), VERY LOOSE
8	SS	15	2, 2, 3, 2	24/24	100		SAND, SILTY, GREEN-GREY, MEDIUM WELL SORTED SUBANGULAR, WET, LOOSE, w/ SHELLS (~1%)
9	SS		17, 12, 12, 13	24/24	100	SP	SAND, SLIGHTLY SILTY, GREY, FINE-MEDIUM, WELL SORTED, SUBANGULAR, DENSE, w/ SHELLS (10%) and OPAQUE MINERALS (1%),
10	SS	20	11, 10, 14, 13			SP	SAND and SHELLS (40%) AS ABOVE,

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS

SAVANNAH RIVER SITE

SOIL BORING LOG

PROJECT NASA Wilson Corners | BORING NO. NASA 05 | DATE 8/16/96

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID
11	SS	20	12, 10, 10, 11	24/24	100	SP	SAND (60%), GREY, FINE, SUBANGULAR, WELL SORTED w/ OPAQUE MINERALS (5%) w/ SHELLS (40%) LIGHT GREY, BLACK, WHITE, TAN, SUBANGULAR COARSE-MEDIUM,	
12	SS		15, 15, 12, 15	24/22	90	SP	SAND (70%) AS ABOVE SHELLS (30%) AS ABOVE	
13	SS	25	5, 7, 7, 10	24/23	96	GW	~~SAND~~ SHELLS (70%) COARSE-MEDIUM GRAINED, VARIOUSLY COLORED, ANGULAR AND SAND, GREY, FINE, SUBANGULAR ~~QUARTZOSE~~ QUARTZOSE	
14	SS		9, 8, 12, 15	24/24	100	GW	SHELLS (90%) AS ABOVE SAND (10%) AS ABOVE	
15	SS	30	18, 24, 23, 20	24/24	100	GW	SHELLS (70%) COARSE-MEDIUM GRAINED, VARIABLY COLORED, ANGULAR, POORLY SORTED SAND (30%), GREY, SLIGHTLY SILTY, FINE, SUBANGULAR, WELL SORTED, QUARTZOSE	PID 1.2 ppm
16	SS		17, 11, 13, 13	24/23	96	SM/~~SW~~ SP	SAND (70%), FINE TO VERY FINE, GREY, SILTY, SUBANGULAR, ~~MEDIUM WELL~~ MEDIUM SORTED, w/ QUARTZOSE, SHELLS (30%) MEDIUM-COARSE GRAINED, VARIABLY COLORED MOSTLY GREY	1.0 PID ppm
17	SS		20, 19, 19, 24	24/12	50			
18	SS	35	9, 12, 13, 14	24/22	90	SP/GW	~~SHELLS~~ SAND (60%) - FINE, LIGHT GREY, FINE, SUBANGULAR, WELL SORTED, WITH 2% OPAQUE MINERALS SHELLS (40%) - COARSE - LIGHT GREY, ANGULAR.	20 ~~30~~ ppm
19	SS		11, 10, 14, 17	24/22	90		SHELLS AND SAND AS ABOVE, INTERBEDDED, MEDIUM DENSE	5 ppm
20	SS	40	3, 5, 7, 13	24/24	100	SM/SP	SAND, SLIGHTLY SILTY, GREY, TO BLUE GREY, FINE, SUBANGULAR, MEDIUM SORTING, w/ SHELLS (5%), MEDIUM DENSE	2 ppm
21	SS		13, 16, 18, 12	24/24	100	SM	SAND, SILTY, BLUE GREY-GREY, FINE, SUBANGULAR, WELL SORTED, w/ OCCASIONAL SHELLY LAYERS, MEDIUM DENSE	2 ppm
22	SS		9, 10, 17, 13	24/24	100	SM	SAND, SILTY, VERY SLIGHTLY CLAYEY FINE-VERY FINE SUBANGULAR, ~~WELL SO~~ MEDIUM SORTED w/ 2% SHELLS BLUE-GREY	0 ppm
23	SS	45	8, 9, 14, 15	24/22	90	SM	SAND, SILTY, BLUE GREY, AS ABOVE	0 ppm
24	SS		4, 6, 9, 7	24/24	100	SM	SAND SILTY, SLIGHTLY CLAYEY, FINE TO VERY FINE, SUBANGULAR, MEDIUM SORTED, w/ 5% SHELLS - OFTEN UNBROKEN	0 ppm
25	SS	50	4, 3, 4, 7	24/22	90	CL	CLAY, SILTY, SANDY, WITH SANDY LAMINAE	0 ppm

TD @ 50 FT.

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS
SAVANNAH RIVER SITE

SOIL BORING LOG

PROJECT NASA - WILSON CORNERS		DATE 8/27/96 AREA
BORING NO. NASA-06	SRS COORDINATES N E	REFERENCE ELEVATION
DRILLER Robert Snow	DRILLING SUBCONTRACTOR GEOTEK	TOTAL HOLE DEPTH 50 ft
TECHNICAL OVERSIGHT James Wedekind	GROUNDWATER DEPTHS DATE TIME DEPTH	DRILLING METHODS AND DEPTHS Hollow Stem Auger with Bentonite Mud
OVERSIGHT COMPANY CDM Federal		

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID
1	SS	0	1, 2, 2, 4	24/23	96	FILL / SM	GRASS AND TOPSOIL WITH SHELL FRAGMENTS AND SAND, SILTY (FILL)	0
2	SS		3, 2, 4, 5	24/23	96	SM	SAND, SILTY, DARK BROWN, FINE, WELL SORTED, SUBANGULAR SLIGHTLY MOIST, LOOSE	0
3	SS	5	3, 4, 3, 3	24/24	100	SM	SAND, SILTY, BROWN GRADES TO LIGHT BROWN, FINE TO MEDIUM, MEDIUM SORTED, SUBANGULAR TO SUBROUND, LOOSE, MOIST	0
4	SS		5, 7, 7, 8	24/24	100	SM (HARDPAN)	SAND, SILTY MILKY WHITE, FINE TO VERY FINE, SUBANGULAR, WELL SORTED, PARTIALLY CEMENTED (HARDPAN), MOIST, MEDIUM DENSE	0
5	SS		2, 3, 3, 5	24/24	100			
6	SS	10	3, 5, 7, 9	24/24	100	SM (HARDPAN)	SAND, LIGHT GREY, SILTY, FINE, SUBANGULAR, WELL SORTED MOIST, MEDIUM DENSE, WITH TRACE FOSSIL DEBRIS WEATHED, WHITE, OCCASIONALLY CEMENTED (HARDPAN); WET	0
7	SS		3, 10, 12, 21	24/24	100	SM (HARDPAN)	SAND, SILTY, GREY, ~~ASABOVE~~, AS ABOVE, CEMENTED IN PART (HARDPAN), MEDIUM DENSE	0
8	SS	15	13, 13, 18, 22	24/24	100	SM (HARDPAN)	SAND, SILTY, LIGHT GREY, FINE, SUBANGULAR, WELL SORTED MOIST, DENSE, PARTIALLY CEMENTED INTO IRREGULAR "NODULES", TRACE SHELL DEBRIS, BECOMES WET	0
9	SS		7, 11, 9, 7	24/24	100	SM (HARDPAN)		
10	SS	20	5, 5, 8, 12	24/24	100	HARDPAN / SHELLS	SHELLS (60-70%) and SAND (40-30%), CEMENTED, POORLY SORTED, ABUNDANT PRIMARY POROSITY, POORLY CONSOLIDATED, MEDIUM DENSE, WET, BECOMES SHELLS (90%), VERY COARSE, WELL SORTED, ANGULAR WITH SAND (10%)	0

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS

SOIL BORING LOG

PAGE 2 OF 2

PROJECT NASA - WILSON CORNERS　　BORING NO. NASA-06　　DATE 8/27/96

NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID
11	SS	20	8, 12, 10, 10	24/24	100	GW/SP (SW)	SAND, GREY, FINE, WELL SORTED, SUBANGULAR, MOIST W/ SHELL HASH, COARSE, MEDIUM SORTED, ANGULAR MEDIUM DENSE (slightly silty)	0
12	SS		10, 11, 12, 12	24/24	100	SW	SAND, GREY, SILTY, COARSE-FINE, SUBANGULAR TO ANGULAR COMPOSED OF QUARTZ (60%) and SHELLS (40%), TRACE OPAQUE MINERALS, MEDIUM DENSE	0
13	SS	25	8, 10, 12, 15	24/24	100	GW/SP		0
14	SS		8, 9, 7, 9	24/24	100	(SW) GW/SP	SAND (50-60%), SILTY, GREY, FINE, WELL SORTED, SUBANGULAR WITH SHELLS (50-40%), COARSE-FINE, POORLY SORTED, ANGULAR	0
15	SS		11, 12, 14, 12	24/24	100	(SW) GW/SP	SAND AND SHELLS, SILTY, FINE-COARSE, AS ABOVE POOR SAMPLE	0 <ADD MU
16	SS	30	12, 8, 9, 13	24/24	100	GW	INTERBEDDED SHELL HASH AND FINE SAND OVER A 0.4 ft INTERVAL UPWARDS FINING FROM	0
17	SS		4, 14, 16, 18	24/24	100	GW/SP	COARSE SHELLS (TAN and GREY) TO GREY SAND. SHELLS SUGGEST HORIZONTAL ATTITUDE MEDIUM DENSE	
18	SS	35	8, 9, 11, 12	24/24	100	SP	SHELLS, COARSE-VERY COARSE (TAN, GREY, WHITE) POORLY SORTED ANGULAR BECOMES SAND SILTY FINE, GREY	0
19	SS		8, 9, 9, 4	24/23	96	SP / SM	SAND, GREY OR TAN-GREY FINE, SUBANGULAR WITH LOCALLY ABUNDANT SHELLS, COARSE, ANGULAR	0 <ADD MU
20	SS		3, 5, 12, 22	24/24	100	SM	SAND, SILTY, BLUISH GREY FINE-VERY FINE, SUBANGULAR, WELL SORTED, FEW SHELLS	
21	SS	40	10, 11, 13, 16	24/24	100	SM	SAND, SILTY, BLUISH GREY, FINE-VERY FINE, AS ABOVE SLIGHTLY MOIST	0
22	SS		7, 8, 11, 11	24/23	96	SM	SAND, SILTY, BLUISH GREY, AS ABOVE, SLIGHTLY PLASTIC SLIGHTLY MOIST, WELL PRESERVED SHELLS AND SOME FRAGMENTS	0
23	SS	45	6, 7, 10, 11	24/20	90	SM	SAND, SILTY BLUISH GREY AS ABOVE — POOR SAMPLE SHELL INTERVAL @ 46 ft WHOLE OR WELL PRESERVED	0
24	SS		4, 5, 5, 6	24/23	96	SM	SAND, SILTY BLUISH GREY, SLIGHTLY CLAYEY, FINE - VERY FINE, SLIGHTLY PLASTIC	0
25	SS	50	1, 2, 4, 6	24/24	100	CL	CLAY, SILTY, SANDY, BLOCKY, PLASTIC WITH WELL PRESERVED SHELLS	0

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

SRS

SOIL BORING LOG

PROJECT: NASA - Wilson Corners		DATE: 8/23/96 AREA:
BORING NO.: NASA - 07	SRS COORDINATES: N E	REFERENCE ELEVATION:
DRILLER: Robert Snow	DRILLING SUBCONTRACTOR: Geotak	TOTAL HOLE DEPTH: 50 ft
TECHNICAL OVERSIGHT: James Wedekind OVERSIGHT COMPANY: CDM Federal	GROUNDWATER DEPTHS: DATE 8/23/96, TIME 1003, DEPTH ~6-8 ft	DRILLING METHODS AND DEPTHS: Hollow Stem Auger w/ Mud (Bentonite)

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID
1	SS	0	1, 1, 1, 3	24/23	96	Fill / SM	Sand and shells, white-black, becomes sand, silty dark grey-brown, subangular, well sorted, fine	0
2	SS		3, 3, 4, 4	24/23	96	SM	Sand, light grey, silty, fine, medium - well sorted, moist, w/ roots, trace organics	0
3	SS	5	3, 4, 10, 13	24/24	100	Pt / SM / Pt	Peat, sandy, dark brown, very silty, slightly moist w/ abundant organics, with interbedded sand, silty, light grey, w/ roots, stiff	0
4	SS		3, 3, 3, 4	24/24	100	Pt / SM	Sand, brown, very silty, fine, subangular, well sorted, moist, loose, sulfur odor	0
5	SS	10	1, 1, 1, WOH	24/24	100	SM	Sand, light brown, silty, fine, subangular, well sorted, laminated, saturated, very loose	0
6	SS		1, 1, 1, WOH	24/23	96	SM	Sand, light brown, silty, fine, as above, slight organics, saturated, very loose	0
7	SS		1, WOH, 1, WOH	24/12	50	SM	Sand, grey, silty, fine, subangular, well sorted, saturated, very loose - possible slough	0
8	SS	15	1, WOH, 1, WOH	24/12	50	SM	Sand, as above - poor sample	0
9	SS		2, 3, 5, 7	24/22	90	SM/SP	Sand, grey, silty, fine, subangular, well-poorly sorted, with shells, white, weathered, locally abundant (2-25%)	0
10	SS	20	2, 3, 3, 4	24/24	100	SW	Sand with shells (20-30%), sand, grey, very fine-fine, shells coarse-medium	0

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS

SOIL BORING LOG

PAGE 2 OF 2

PROJECT NASA Wilson Corners BORING NO. NASA-07 DATE 8/23/96

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID (ppm)
11	SS	20	4, 5, 6, 10	24/24	100	SW	SHELLS (60%) and SAND (40%), GREY, VARIED COLORED, COARSE-FINE, POORLY SORTED, ANGULAR-SUBANGULAR. SAND IS QUARTZOSE (98%) WITH (1%) OPAQUE MINERALS	0
12	SS		4, 5, 6, 12	24/24	100	GW/SP	SHELLS (60-70%) and SAND (40-30%) SHELLS, VARIABLY COLORED (GREY WHITE, TAN, BLACK) VERY COARSE-FINE GRAINED, POORLY SORTED	0
13	SS	25	6, 7, 13, 13	24/24	100	SW	ANGULAR. SAND IS FINE-VERY FINE, SUBANGULAR WELL SORTED; GRADES TO SAND, SILTY WITH ABUNDANT SHELLS	0
14	SS		6, 6, 10, 12	24/24	100	SW, GW/SP	SAND (70%) and SHELLS (30%), GREY, POORLY SORTED, AS ABOVE (25% slough)	0
15	SS	30	6, 8, 10, 24	24/24	100	SP	SAND, GREY, FINE, SUBANGULAR-SUBROUND, WELL SORTED, CLEAN QUARTZ SAND WITH 1-2% OPAQUE MINERALS, SOME SHELLS <1%, COARSE	0
16	SS		8, 10, 17, 15	24/23	96	GW/SP	SHELLS, VARIABLY COLORED (80%) and SAND AS ABOVE GRADES TO SAND, GREY, FINE WITH FEW SHELLS	0
17	SS		4, 6, 9, 10	24/23	96	GW/SP	BECOMES LIGHT TAN, SHELLY	
18	SS	35	8, 9, 11, 10	24/23	96	SW	SAND, SLIGHTLY SILTY, TAN to LIGHT GREY, FINE, WELL SORTED WITH SHELLS (30-50%), VARIABLY COLORED, COARSE-MEDIUM, ANGULAR	0
19	SS		5, 7, 9, 16	24/22	90	SM	SAND, SILTY, BLUE-GREY, FINE-VERY FINE, SUBANGULAR WELL SORTED, SHELLS (<10%) MOSTLY BROKEN, MOIST, SLIGHTLY PLASTIC	20
20	SS	40	5, 6, 9, 14	24/24	100	SM	SAND, SILTY, BLUISH GREY, AS ABOVE, OCCASIONALLY SHELLY LAYERS, COARSE	10-20
21	SS		6, 6, 10, 10	24/23	96	SM	SAND, SILTY, BLUISH GREY, FINE-VERY FINE, SUBANGULAR, WELL SORTED, OCCASIONAL SHELL FRAGMENTS (3-5%)	<20 PID malfunctioning
22	SS		2, 2, 3, 6	24/22	90	SM	SAND, SILTY, SLIGHTLY CLAYEY, SLIGHTLY PLASTIC, FINE-VERY FINE, BLUISH-GREY, MOIST	
23	SS	45	2, 3, 3, 5	24/24	100	SM	SAND, SILTY, SLIGHTLY CLAYEY, VERY SLIGHTLY PLASTIC BLUE-GREY, FINE TO VERY FINE, SUBANGULAR TO SUBROUND, WELL SORTED, MOIST, WITH WELL PRESERVED SHELLS	
24	SS		5, 7, 8, 11	24/22	90	SM/SC		
25	SS	50	1, 3, 5, 7	24/24	100	CSCU, CL	SHELLS, SANDY, SILTY, VERY WELL PRESERVED. CLAY SANDY SILTY PLASTIC, LAMINATED	

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS

SOIL BORING LOG

PAGE 1 OF

PROJECT		DATE
NASA-09 (GW) WILSON CORNERS		8/29/96
		AREA
BORING NO. NASA-09	SRS COORDINATES N E	REFERENCE ELEVATION
DRILLER Robert Snow	DRILLING SUBCONTRACTOR GEOTEK	TOTAL HOLE DEPTH 50 ft
TECHNICAL OVERSIGHT James Wedekind	GROUNDWATER DEPTHS DATE TIME DEPTH	DRILLING METHODS AND DEPTHS HOLLOW STEM AUGER
OVERSIGHT COMPANY CDM Federal		

SAMPLING NO	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID
		0					GRASS and SAND, BROWN, SILTY	
						SM	SAND, LIGHT BROWN, SILTY	
		5				PEAT	PEAT, SANDY, BLACK TO DARK BROWN, VERY SILTY — AUGER DRILL TO 14 ft	
							WET @ ~8 ft	
						SM	SAND, DARK BROWN, SILTY, WET	
		10						
						SM	SAND, DARK BROWN, SILTY, WET	
							14'	
1		15	1, 1, 3, 5	24/12	50	SM	SAND, SILTY, GREY, BECOMES LIGHTER GREY, FINE, WELL SORTED, SUBANGULAR, WITH SHELLS WHITE, WEATHERED IN ~2-in INTERVAL @ ~15 ft.	0
2			7, 6, 7, 8	24/24	100	SP/GW	SAND (50-60%), GREY, SILTY, FINE, WELL SORTED, SUBANGULAR WITH SHELLS (50-40%), MOSTLY WHITE, COARSE-MEDIUM, SLIGHTLY WEATHERED.	8/28
3		20	1, 1, 4, 6	24/12				8/30 ADD MUD *

-> MUD >

*PID Malfunction

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS
SAVANNAH RIVER SITE

SOIL BORING LOG

PAGE 2 OF 2

PROJECT NASA - Wilson Corners   BORING NO. NASA-09   DATE 8/30/96

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID
4	SS	20	4, 4, 4, 7	24/23	96	GW/SP (SW)	SHELLS (70%) and SAND (30%) SHELLS, VARIABLY COLORED-MOSTLY GREY, COARSE-FINE, POORLY SORTED, ANGULAR. SAND, GREY,	*
5	SS		7, 8, 10, 12	24/24	100		SILTY, FINE, WELL SORTED, MEDIUM DENSE, MOIST	*
6	SS	25	4, 4, 5, 5	24/24	100	SW	SAND (70%), GREY, FINE-MEDIUM, SILTY IN PART, MEDIUM-WELL SORTED, WITH ABUNDANT SHELL FRAGMENTS	*
7	SS		8, 7, 7, 5	24/24	100	GW/SP	SHELLS (70%) LIGHT TAN, COARSE-MEDIUM, MEDIUM-POORLY SORTED, ANGULAR WITH SAND (30%), GREY, FINE, QUARTZOSE	*
8	SS		5, 11, 16, 21	24/24	100	GW/SP	SHELLS→SAND FINING UPWARDS SEQUENCES	* O
9	SS	30	17, 22, 26, XX	18/24	100	GW/SP	SHELLS (60-70%) and SAND (40-30%), INTERBEDDED AS UPWARDS-FINING SEQUENCES SAND, GREY, FINE, SLIGHTLY SILTY, WELL SORTED SUBANGULAR, QUARTZOSE WITH TRACE OPAQUES	<ADD MUD
10	SS		7, 9, 10, 11	24/24	100		SHELLS, TAN TO GREY, COARSE TO FINE, SLIGHTLY SILTY, POORLY - MEDIUM SORTED, ANGULAR, MEDIUM DENSE	O
11	SS	35	6, 8, 9, 12	24/24	100	SM	SAND, SILTY, LIGHT BLUISH GREY, FINE, WELL SORTED EXCEPT FOR SHELLS (5%) COARSE, ANGULAR, MOIST	O
12	SS		8, 7, 7, 9	24/16	67	SM	SAND SILTY BLUISH GREY, FINE-VERY FINE AS ABOVE WITH WELL PRESERVED SHELLS, MOIST MEDIUM DENSE	O
13	SS		3, 3, 3, 9	24/20	80	SM	SAND, SILTY, BLUISH GREY, AS ABOVE - POOR SAMPLE	O
14	SS	40	5, 7, 8, 13	24/24	100	SM	SAND, SILTY, BLUISH GREY, AS ABOVE, LOOSE	
15	SS		4, 4, 4, 6	24/23	96	SM	SAND, BLUISH-GREY, SILTY WITH WELL PRESERVED SHELLS RARE - WET, LOOSE, SLIGHTLY COHESIVE	O
16	SS	45	3, 3, 4, 5	24/23	96	SM	SAND, BLUISH-GREY AS ABOVE, EXCEPT ABUNDANT SHELL LAYERS, LOOSE	O
17	SS		1, 3, 7, 13	24/23	96	SM	SAND, BLUISH-GREY FINE-VERY FINE, VERY SILTY, WITH OCCASIONAL SHELLS, WELL PRESERVED, LOOSE, MOIST	O
18	SS	50	1, 1, 3, 3	24/20	90	CL	CLAY, SANDY, SILTY, BLUE-GREY, PLASTIC, BLOCKY WITH SAND STRINGERS	O

** Auger [illegible] of slough - drilled.

* PID Malfunction - probably humidity - based

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS

SOIL BORING LOG

PAGE 1 OF 2

PROJECT: NASA - Wilson Corners	DATE: 8/28/96 AREA: —

BORING NO.: NASA-10	SRS COORDINATES N E	REFERENCE ELEVATION
DRILLER: Robert Snow	DRILLING SUBCONTRACTOR: Geotek	TOTAL HOLE DEPTH: 50 ft
TECHNICAL OVERSIGHT: James Wedekind OVERSIGHT COMPANY: CDM Federal	GROUNDWATER DEPTHS DATE TIME DEPTH	DRILLING METHODS AND DEPTHS: Hollow Stem Auger

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID
		0					Grass and sand, silty, grey	
						SM	Sand, silty, brown	
		5						
						SM	Sand, silty, grey, wet AUGER DRILL TO 14 ft OBSERVE CUTTINGS ONLY	
		10						
						SM	Sand silty, grey w/ occasional shells, white, weathered, wet	
1	SS	15	5 9 9 13	24/18	80	GW/SP	Shells (60-70%), variably colored (grey, white) coarse-fine, angular medium-poorly sorted Sand (40-50%), slightly silty, fine, well sorted subangular, wet, medium dense	0 <ADD MUD
2	SS		3 5 8 6	24/12	50	GW/SP	Shells (70-80%), as above Sand (30-40%) as above Poor sample	0
3	SS	20	3 5 5 7	24/18	80	GW/SP	Shells (50-60%), grey, white, coarse-fine, medium-poorly sorted, angular with Sand (30-40%), grey, fine, well sorted, subangular, wet, loose	0

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS
SAVANNAH RIVER SITE

SOIL BORING LOG

PAGE 2 OF 2

PROJECT NASA - WILSON CORNERS BORING NO. NASA - 10 DATE 8/28/96

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID
4	SS	20	7, 8, 10, 10	24/20	90	GW/SP (SW)	SAND (50-40%) and SHELLS (50-60%), GREY, POORLY SORTED, ANGULAR TO SUBANGULAR, FINE-COARSE, WET, MEDIUM DENSE	0
5	SS		6, 5, 8, 12	24/24	100	GW/SP		0
6	SS	25	7, 8, 8, 15	24/24	100	(SW) GW/SP	SAND (50-60%) and SHELLS (50-40%), VARIABLY COLORED OR GREY, FINE - COARSE, ANGULAR - SUBANGULAR, WELL-POORLY SORTED, HARDPAN IN PART	0
7	SS		9, 10, 15, 15	24/24	100	(SW)		0
8	SS		4, 7, 6, 12	24/24	100	SW	SAND (70-95%), LIGHT GREY OR TANNISH-GREY, FINE-COARSE (SHELLS), WELL-POORLY SORTED, SUBANGULAR WITH SHELL HASH, OFTEN LAMINATED	0
9	SS	30	10, 14, 14, 18	24/18	80	SP/SM	SAND, GREY, SLIGHTLY SILTY, FINE, WELL SORTED, SUBANGULAR WITH FEW (<1%) SHELL FRAGMENTS	0 ADD <MUD
10	SS		5, 7, 8, 11	24/22	90	SW	SAND, GREY, SLIGHTLY SILTY MEDIUM-FINE, MEDIUM-POORLY SORTED, WITH SHELLS (10-20%)	1-3 ppm (
11	SS	35	8, 9, 9, 10	24/22	90	GW/SP	SAND (60-70%), GREY, FINE, SLIGHTLY SILTY, WELL SORTED, SUBANGULAR WITH ABUNDANT SHELLS (40-30%) COARSE-FINE, POORLY SORTED, ANGULAR, MOIST, BECOMES...	0-1.5 ppm
12	SS		6, 7, 7, 15	24/23	96	SM	SAND, SILTY, FINE - VERY FINE, WELL SORTED, SUBANGULAR WITH WELL PRESERVED SHELLS and OCCASIONAL LAYERS OF SHELL FRAGMENTS, BLUISH GREY	0
13	SS		3, 4, 6, 8	24/22	92	SM		0
14	SS	40	5, 7, 9, 14	24/20	90	SM	SAND, SILTY BLUISH GREY FINE - VERY FINE WITH OCCASIONAL WELL PRESERVED PELECYPOD TESTS MEDIUM DENSE	0
15	SS	(9?)	3, 3, 4, 10	24/24	100	SM	SAND, SILTY, BLUISH GREY, AS ABOVE, SLIGHTLY MOIST, LOOSE	0
16	SS	45	1, WOH, 2, 4	24/24	100	SM	SAND, SILTY, BLUISH GREY, VERY SLIGHTLY CLAYEY, MOIST	0
17	SS		2, 3, 3, 6	24/23	96	SM	SAND, SILTY, BLUISH GREY WITH LOCALLY ABUNDANT WHOLE SHELL INTERVALS OR SHELL HASH, LOOSE	0
18	SS	50	1, 1, 3, 7	24/24		SM / CL	CLAY, SILTY BLUISH-GREY WITH SHELLS, CLAYEY AS ABOVE	0

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS

SOIL BORING LOG

PAGE 1 OF 3

PROJECT: NASA - WILSON CORNERS	DATE: 8/19/96
	AREA:

BORING NO.: NASA-11	SRS COORDINATES: N E	REFERENCE ELEVATION:
DRILLER: ROBERT SNOW	DRILLING SUBCONTRACTOR: GEOTEK	TOTAL HOLE DEPTH: 52 ft
TECHNICAL OVERSIGHT: JAMES WEDEKIND	GROUNDWATER DEPTHS: DATE TIME DEPTH	DRILLING METHODS AND DEPTHS: HOLLOW STEM AUGER W/ BENTONITE MUD
OVERSIGHT COMPANY: CDM FEDERAL		

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID
1	SS	0	1, 2, 2, 2	24/18	75	SM	SAND, GREY AND DARK GREY, SILTY (9W) ~~FINE~~, FINE, SUBANGULAR WELL SORTED, SOME ORGANICS (FILL?)	0
2	SS		4, 4, 4, 5	24/23	96	SM	SAND, WHITE TO LIGHT GREY, OCCASIONAL BROWN STREAKS, SILTY IN PART, FINE, SUBANGULAR TO ANGULAR, WELL SORTED, TRACE ORGANICS, ROOTS (FILL?) - MOIST	0
3	SS	5	2, 2, 8, 9	24/24	100	PT	PEAT, SANDY, VERY SILTY, LIGHT GREY BECOMES ~~WITH~~ BLACK WITH ROOTS DRY (9W)	0
4	SS		11, 15, 17, 19	24/24	100	SM	SAND, SILTY, BROWN TO DARK BROWN, FINE, SUBANGULAR, WELL SORTED, ABUNDANT ORGANIC MATERIAL	0
5	SS		8, 9, 10, 11	24/24	100	SM	SAND, VERY SILTY, BROWN TO DARK BROWN, PEATY, AS ABOVE, MOIST	0
6	SS	10	4, 5, 5, 6	24/24	100	SM	SAND, VERY SILTY, BROWN, AS ABOVE, WET *SAMPLE 50% SLOUGH*	0
7	SS		3, 3, 4, 2	24/24	100	SM	SAND, SILTY, YELLOW BROWN, SLIGHTLY PEATY, SUBANGULAR, FINE, WELL SORTED, TRACE ORGANICS	0
8	SS	15	2, 3, 4, 4	24/23	96	SM	SAND, SILTY, YELLOW BROWN, AS ABOVE	
9	SS		2, 1, 1, 1	24/23	96	SM	SAND, SILTY, DULL GREENISH GREY, FINE, SUBANGULAR, WELL SORTED, TRACE ORGANICS, SOME DARKER, THIN LAMINATED INTERVALS, VERY SOFT	0
10	SS	20	1, 2, 3, 6	24/24	100	SP	SAND, SLIGHTLY SILTY, GREENISH GREY, FINE-VERY FINE, SUBANGULAR, W/ TRACE SHELL DEBRIS	0

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS
SAVANNAH RIVER SITE

SOIL BORING LOG

PROJECT NASA Wilson Corners BORING NO. NASA-11 DATE 8/19/96

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	Pi
11	SS	20	2, 2, 3, 9	24/20	85	SP/SM	SAND, SLIGHTLY SILTY GREENISH GREY, FINE TO VERY FINE SUBANGULAR, WELL-MEDIUM SORTING, w/ SHELL FRAGMENTS (~2%) - POOR SAMPLE 40% SLOUGH -	0
12	SS		7, 7, 6, 7	24/23	96	SP/GW	SAND (50%), SLIGHTLY SILTY, GREY, FINE-VERY FINE AS ABOVE. SHELLS (50%), COARSE-FINE, VARIABLY COLORED (GREY, WHITE)	0
13	SS	25	6, 7, 8, 9	24/24	100		POORLY SORTED, ANGULAR-SUBANGULAR, MEDIUM DENSE (92)	
14	SS		9, 9, 9, 10	24/24	100	SW (92)	SAND (60%), SLIGHTLY SILTY, GREY, FINE, SUBANGULAR, ~~POORLY~~ WELL SORTED. AND, SHELLS (40%), VARIABLY COLORED (GREY, WHITE, TAN), ANGULAR, MEDIUM DENSE	0
15	SS		1, 3, 3, 7	24/24	100			
16	SS	30	6, 5, 7, 9	24/24	100	SW	SAND, (70%), SLIGHTLY SILTY, GREY, FINE, SUBANGULAR POORLY SORTED, QUARTZOSE (70%) w/ OPAQUE MINERALS (<1%) and SHELLS (30%), VARIABLY COLORED, ANGULAR, COARSE-FINE LOOSE-MEDIUM DENSE	0
17	SS		10, 4, 6, 5	24/24	100	SW	SAND (70%), SLIGHTLY SILTY w/ SHELLS (30%) AS ABOVE POORLY SORTED, COARSE-FINE, MEDIUM DENSE	0
18	SS	35	10, 9, 9, 18	24/24	100	SP/GW	SAND (60%) VERY SLIGHTLY SILTY, GREY, FINE, WELL SORTED, SUBANGULAR, QUARTZOSE WITH OPAQUE MINERALS AND SHELLS (40%), VARIABLY COLORED (GREY, WHITE, BLACK, TAN)	0
19	SS		8, 7, 16, 15	24/24	100		COARSE-FINE, POORLY SORTED, ANGULAR, MEDIUM DENSE BECOMES LIGHT GREYISH BROWN WITH RARE DARK GREY STREAKS	0
20	SS		9, 11, 12, 11	24/22	90		SAND, SILTY, BLUISH GREY, FINE TO VERY FINE, SUBANGULAR	0
21	SS	40	8, 9, 11, 11	24/22	90	SP/SM	WELL SORTED, QUARTZOSE, MEDIUM DENSE, WITH SHELLS (2%)	
22	SS		3, 5, 6, 10	24/24	100	SP/SM	SAND, SILTY, BLUISH GREY, FINE TO VERY FINE, SUBANGULAR WELL SORTED, WITH SHELLS (2-5%), COARSE GRAINED, SUBANGULAR, POORLY SORTED, MEDIUM DENSE	0
23	SS	45	6, 12, 11, 12	24/24	100			
24	SS		6, 8, 10, 10	24/24	100		SAND, SILTY, BLUISH GREY, FINE TO VERY FINE, SUBANGULAR WELL SORTED WITH SHELLS (2%) COARSE GRAINED MEDIUM SORTED, ANGULAR, MEDIUM DENSE	0
25	SS	50	9, 9, 9, 10	24/23	96		SAND, SILTY, SLIGHTLY CLAYEY FINE TO VERY FINE AS ABOVE WITH WELL PRESERVED SHELLS - GREY TO BLUE GREY	

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS

SOIL BORING LOG

PROJECT NASA Wilson Corners BORING NO. NASA-11 DATE 8/19/96

SAMPLING NO.	SAMPLING TYPE	SAMPLING DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION
		50	6			SM	
26	SS		7	24/24	100		
			6			CL/ML	CLAY, SILTY, SLIGHTLY SANDY, BLUISH GREY, STIFF
			9				WITH THIN BEDS OF SHELLS OR CLAYEY SAND.
							Total Depth @ 52 ft.
		5					
		0					
		5					
		0					
		5					
		0					

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

SRS

SOIL BORING LOG

PROJECT: NASA - WILSON CORNERS		DATE: 8/21/96 AREA:
BORING NO.: NASA-14	SRS COORDINATES N E	REFERENCE ELEVATION
DRILLER: ROBERT SNOW	DRILLING SUBCONTRACTOR: GEOTEK	TOTAL HOLE DEPTH: 54 FT
TECHNICAL OVERSIGHT: JAMES WEDEKIND	GROUNDWATER DEPTHS (DATE / TIME / DEPTH)	DRILLING METHODS AND DEPTHS: HOLLOW STEM AUGER W/ BENTONITE MUD
OVERSIGHT COMPANY: CDM FEDERAL		

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID (ppm)
1	SS	0	1, 1, 1, WOH*	24/23	96	FILL	GRASS AND TOPSOIL WITH LIMEROCK CRUSHED STONE SHELLS AND SAND, SILTY BLACK-WHITE (FILL)	0
2	SS		1, 2, 1, 3	24/23	96	FILL	SILT, SANDY, BLACK TO DARK BROWN, WITH SHELLS (FILL) WET, SOFT - TRACE PLASTIC PIPE (DRAINFIELD ?) - CINDER BLOCK IN CUTTINGS	0
3	SS	5	1, 4, 3, 5	24/20	90	FILL	SAND, DARK BROWN, VERY SILTY, WITH ABUNDANT ORGANICS WET, WITH ROOTS, FIRM	0
4	SS		2, 3, 5, 17	24/24	100	TOPSOIL SM PT	TOPSOIL, BLACK, SILTY, MANY ROOTS SAND, GREY, FINE, SILTY WITH ROOTS, SOFT, WET PEAT, VERY SILTY, SANDY, FINE, BLACK TO DARK, MOIST VERY STIFF	0
5	SS	10	6, 9, 10, 7	24/18	80	SM	SAND, VERY SILTY, DARK BROWN, FINE, SUBANGULAR, MEDIUM-WELL SORTED, MOIST, MEDIUM DENSE	0
6	SS		1, 1, 1, 1	24/24	100	SM	SAND, SILTY, BROWN, SUBANGULAR, FINE TO VERY FINE WELL SORTED, WET, VERY SOFT, QUARTZOSE WITH VERY FEW OPAQUES	0
7	SS		1, WOH, 1, WOH	24/24	100	SM	POOR SAMPLE (BOTTOM 6" OK) SAND, SILTY BROWN, THEN GREY, FINE TO VERY FINE, WELL SORTED WET, VERY SOFT	0
8	SS	15	1, 1, 1, 2	24/24	100	SM	- BETTER SAMPLE (50% SLOUGH) SAND, SILTY VERY FINE TO FINE, MEDIUM-WELL SORTED SUBANGULAR TO SUBROUND, WET, VERY SOFT, GREY, TRACE SHELL	0
9	SS		6, 9, 17, 22	24/24	100	SM	50% SLOUGH SAND, SILTY, VERY FINE TO FINE, MEDIUM-WELL SORTED SUBANGULAR TO SUBROUND, MEDIUM DENSE, WET BLUISH GREY TO GREY, SOME SHELL FRAGMENTS	0
10	SS	20	12, 21, 21, 25	24/0	0	GW/SP ?	100% SLOUGH - NO SAMPLE - (SHELLS ?) - PIPE STUCK ADD WATER	

* WOH - Weight on Hammer

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS
SAVANNAH RIVER SITE

SOIL BORING LOG

PAGE 2 OF 3

PROJECT NASA- Wilson Corners BORING NO. NASA-14 DATE 8/21/96

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID above background (ppm)
11 (6)	SS	20	4, 3, 6, 7	24/23	96	GW/SP (SW)	SHELLS, VARIABLY COLORED (GREY, BLACK, WHITE, TAN) COARSE-FINE, ANGULAR, POORLY SORTED WITH SAND (30-40%), GREY, FINE, SLIGHTLY SILTY, SUBANGULAR WELL SORTED, LOOSE-MEDIUM DENSE, MOIST	0
12 (6)	SS		4, 6, 7, 7	24/23	96			6-13 ppm
13 (6)	SS	25	4, 3, 3, 6	24/23	96	SP/GW (SW)	SAND, SLIGHTLY SILTY, GREY TO LIGHT GREY, FINE, ANGULAR WELL SORTED WITH SHELLS (40%), VARIABLY COLORED, COARSE-FINE, POORLY SORTED, ANGULAR, LOOSE, MOIST	4-8 ppm
14	SS		5, 7, 5, 10	24/24	100			3.5
15 (6)	SS		6, 7, 8, 7	24/24	100	GW/SP (6)	SHELLS (70-40%) VARIABLY COLORED, COARSE-FINE, ANGULAR, POORLY SORTED, WITH SAND (30-60%), GREY FINE WELL SORTED, SUBANGULAR, MEDIUM DENSE, MOIST. BECOMES SANDIER @ 32 ft	7-12
16	SS	30	5, 6, 6, 8	24/24	100	GW/SP		1.2
17 (6)	SS		7, 8, 9, 11	24/24	100	GW/SP (SW)	SHELLS (70%), VARIABLY COLORED (GREY, WHITE, TAN, BLACK) VERY COARSE TO FINE, POORLY SORTED, ANGULAR, HORIZONTALLY ~~STRATIFIED~~ (6) ORIENTED WITH SAND (30%), GREY, FINE-VERY FINE, SLIGHTLY SILTY, AS ABOVE, MEDIUM DENSE, MOIST	0
18	SS	35	10, 11, 13, 13	24/24	100	GW/SP		0
19	SS		10, 12, 14, 14	24/24	100	GW/SP	SHELLS (60%), AND SAND (40%), AS ABOVE SILTY, BLUISH-GREY SAND AT BASE	20-30
20	SS		5, 10, 9, 4	24/24	100	SM/SP	SAND, SILTY, BLUISH-GREY, FINE-VERY FINE, SUBANGULAR WELL SORTED WITH SHELLS (~2%), WELL PRESERVED THROUGHOUT	10-20
21	SS	40	6, 11, 14, 14	24/24	100	GW / SM	SHELLS, COARSE, VARIABLY COLORED, POORLY SORTED @ 41 ft	15-20
22	SS		8, 9, 12, 14	24/24	100	SW / SM	SAND, SILTY, BLUISH GREY, FINE-VERY FINE, WELL SORTED, SUBANGULAR. SAND, ~~SHELLY~~ SILTY WITH ABUNDANT SHELLS INTERBEDDED WITH SAND, SILTY, BLUISH GREY WITH WELL PRESERVED SHELLS, MEDIUM DENSE	10-20-SM 30-SHELLS 3-SM
23	SS	45	8, 6, 6, 9	24/24	100			0
24	SS		7, 8, 12, 12	24/24	100	SM	SAND, SILTY, SLIGHTLY CLAYEY, WELL SORTED, BLUISH GREY, WITH WELL PRESERVED SHELLS, MOIST, MEDIUM DENSE	0
25	SS	50		24/24	100	SM	SAND, SILTY, SLIGHTLY CLAYEY, BLUISH GREY, AS ABOVE	0

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

* (6) Variable background values (<0.5 ppm typically)

SRS
SAVANNAH RIVER SITE

SOIL BORING LOG

PROJECT NASA - WILSON CORNERS BORING NO. NASA - 04 DATE 8/21/96

SAMPLING NO.	SAMPLING TYPE	SAMPLING DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID
		50	1				SAND, SILTY, CLAYEY, BLUE-GREY, FINE-VERY FINE	0
26	SS		1	24/23	96	SM/SC	WELL SORTED, SUBANGULAR, WITH WELL PRESERVED	
			3				SHELLS, OCCASIONALLY LAMINATED	0
			6					
			5					
27	SS		3	24/22	90	SC		
			3			SM	CLAY, SILTY, SANDY, BLUISH GREY, LAMINATED	
			5			SM/SC	SAND, SILTY, CLAYEY, BLUE-GREY WITH OCCASIONAL	
		55					SHELL LAYERS	
							TOTAL DEPTH @ 54 ft	
		60						
		5						
		0						
		5						
		0						

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS

SOIL BORING LOG

PROJECT NASA Wilson Corners		DATE 8/17/96
		AREA —
BORING NO. NASA-16	SRS COORDINATES N E	REFERENCE ELEVATION
DRILLER Robert Snow	DRILLING SUBCONTRACTOR Geotek	TOTAL HOLE DEPTH 50 ft
TECHNICAL OVERSIGHT James Wedekind	GROUNDWATER DEPTHS DATE 8/17/96 TIME 0950 DEPTH 7 ft	DRILLING METHODS AND DEPTHS Hollow Stem Auger w/ Bentonite Mud
OVERSIGHT COMPANY CDM Federal		

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION
1	SS	0	2, 3, 5, 5	24/20	90	FILL	Topsoil and limerock, dark brown, silty, sandy grades to peat, sandy, at base (FILL)
2	SS		3, 3, 8, 11	24/23	96	SM	Sand, silty, dark brown, fine, subangular, medium sorted, w/ few shells, abundant organics, some topsoil, medium dense
3	SS	5	4, 5, 11, 11	24/22	92	SM	Sand, silty, brown to light brown, subangular, medium sorted, with roots, organics, medium dense
4	SS		7, 10, 9, 11	24/23	96	PL	Peat, sandy, silty, highly organic grades to sand, brown silty slightly moist, medium dense
5	SS	10	7, 6, 9, 12	24/24	100	SM	Sand, silty, brown, subangular, well sorted w/ organics, moist
6	SS		5, 15, 18, 21	24/24	100	SP	Sand (70%) ~~sand~~, light grey, slightly silty, subangular medium sorting, w/ abundant shells (30%), angular coarse-medium grained
7	SS		6, 8, 10, 12	24/23	100	GW / SP	Shells (70%) very light grey, sandy, silty, angular, broken, coarse to medium; Sand (70%) silty, brown and grey, fine to very fine trace organics, becomes blue-grey, well sorted, fine w/ shells
8	SS	15	7, 4, 10, 14	24/20	90		Sand, ~~brown~~ grey, very slightly silty, fine to very fine, subangular, well sorted, few shells
9	SS		21, 21, 20, 18				Sand, as above, except brown - possibly slough !! - poor sample
10	SS	20	5, 5, 7, 5	24/12	50	GW	Shells (60%), sandy, grey, coarse-fine, angular poorly sorted, and sand (40%) grey, fine

Right margin annotations: PID; —; —; 0; 1 ppm; 0

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS
SAVANNAH RIVER SITE

SOIL BORING LOG

PROJECT NASA Wilson Corners   BORING NO. NASA-16   DATE 8/17/96

NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID
11	SS	20	5, 6, 5, 6	24/24	100	SP/GW	SAND (60%), GREY, FINE/VERY FINE, SLIGHTLY SILTY, SUBANGULAR, WELL SORTED, W/ SHELLS; SHELLS (40%) VARIABLY COLORED, GREY, WHITE, BLACK, TAN, ANGULAR, COARSE-FINE, LOOSE-MEDIUM DENSE	1 ppm
12	SS		9, 10, 9, 12	24/24	100		SAND AND SHELLS AS ABOVE	0 ppm
13	SS	25	9, 7, 9, 6	24/24	100	GW/SP	SHELLS (70%), VARIABLY COLORED, COARSE-FINE, AS ABOVE AND SAND (30%), GREY, FINE-VERY FINE, ANGULAR, MEDIUM-WELL SORTED, MEDIUM DENSE	0 ppm
14	SS		4, 7, 9, 8	24/18	75	GW/SP	SHELLS AS ABOVE	0 ppm
15	SS	30	8, 13, 15, 13	24/24	100	GW/SP	SHELLS (70%), VARIABLY COLORED (GREY, BLACK, YELLOW, LIGHT BROWN), COARSE-FINE, ANGULAR, POORLY SORTED, W/ SAND (30%), GREY, SLIGHTLY SILTY, SUBANGULAR, WELL SORTED, QUARTZOSE (98%) W/ OPAQUE MINERALS (~2%)	0 ppm
16	SS		7, 6, 7, 7	24/24	100		GRADES TO SAND, SHELLY, MEDIUM DENSE	
17	SS		9, 10, 7, 7	24/24	100	SP/GW	SAND (70%), GREY, SLIGHTLY SILTY, FINE TO VERY FINE, WELL-MEDIUM SORTING, SUBANGULAR, MEDIUM DENSE WITH SHELLS (30%), VARIABLY COLORED, SUBANGULAR	0 ppm
18	SS	35	7, 11, 13, 15	24/24	100		BECOMES LIGHTER GREY, TAN @ 36 ft	
19	SS		9, 6, 7, 9	24/23	96	SP/GW	SAND (80%), LIGHT GREY, FINE, WELL-MEDIUM SORTING, W/ SHELLS (20%), LIGHT BROWN, GREY, COARSE, BROKEN, ANGULAR	0 ~~ppm~~ ppb
20	SS	40	9, 10, 11, 14	24/24	100	SP	SAND AS ABOVE EXCEPT SLIGHTLY BLUISH-GREEN, SLIGHTLY SILTY	
21	SS		6, 5, 5, 5	24/24	100	SP/SM	SAND SLIGHTLY SILTY, CLAYEY, BLUISH GREY, FINE TO VERY FINE, WELL SORTED, SUBANGULAR, WITH SHELLS (2%) COARSE-FINE OFTEN WHOLE	0 ~~ppm~~ ppb
22	SS		4, 5, 5, 8	24/24	100	SM	SAND, SILTY, CLAYEY, BLUISH GREY, FINE TO VERY FINE, WELL SORTED, SUBANGULAR, OCCASIONALLY SUBROUND, WITH WELL PRESERVED SHELLS (2%), SLIGHTLY PLASTIC, MOIST	0 ppm
23	SS	45	4, 5, 8, 13	24/24	100			
24	SS		5, 6, 7, 6	24/24	100	SM	SAND, AS ABOVE, SLIGHTLY MORE SHELL FRAGMENTS	
25	SS	50	5, 6, 7, 9	24/24	100	CL	CLAY, SILTY, SANDY, BLUISH GREY OR GREENISH GREY, OCCASIONAL THIN SHELL LAYERS, STIFF	0 ppm

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

SRS SAVANNAH RIVER SITE

SOIL BORING LOG

PROJECT: NASA - Wilson Corners		DATE: 8/29/96
		AREA:
BORING NO.: NASA - 17	SRS COORDINATES: N E	REFERENCE ELEVATION:
DRILLER: Robert Snow	DRILLING SUBCONTRACTOR: Geotek	TOTAL HOLE DEPTH: 50 ft
TECHNICAL OVERSIGHT: James Wedekind	GROUNDWATER DEPTHS (DATE, TIME, DEPTH):	DRILLING METHODS AND DEPTHS: Hollow Stem Augers
OVERSIGHT COMPANY: CDM Federal		

SAMPLING NO	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID
1 (9u)		0					GRASS AND SAND, SILTY, LIGHT GREY	
2 (9u)						SM	SAND, SILTY, LIGHT BROWN.	
3 (9u)		5						
4 (9u)						SM	SAND, SILTY, LIGHT BROWN, WET — AUGER ONLY TO 14 ft	
		10						
				9u		SM		
1	SS	15	3, 5, 10, 19	24/24	100	SM	SAND, SILTY, GREY, FINE-MEDIUM, WELL SORTED, SUBANGULAR, WITH SHELLS (FRAGMENTS), ABUNDANT @ BASE	NR
2	SS		10, 11, 11, 13	24/20	90	GW/SP (SW)	SAND (50%), SLIGHTLY SILTY, GREY, FINE, WELL SORTED, SUBANGULAR WITH SHELLS (50-70%), MOSTLY GREY, MEDIUM SORTED, ANGULAR	* NR
3	SS	20	11, 9, 13, 11	24/24	100		SAND (60-70%), GREY, FINE, WITH ABUNDANT SHELL FRAGMENTS - SHELL HASH	0

* PID Malfunction - humidity?

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS
SAVANNAH RIVER SITE

SOIL BORING LOG

PAGE 2 OF 2

PROJECT NASA - Wilson Corners BORING NO. NASA-17 DATE 8/25/96

SAMPLING NO	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION
4	SS	20	9, 8, 7, 9	24/24	100	GW/SP (SW)	SAND, SLIGHTLY SILTY FINE GREY WELL SORTED SUBANGULAR, QUARTZOSE WITH TRACE OPAQUE MINERALS WITH SHELLS (30-40%), MOSTLY LIGHT GREY OR WHITE
5	SS		5, 7, 8, 9	24/24	100		ANGULAR, COARSE-FINE, MEDIUM-POORLY SORTED, WET MEDIUM DENSE
6	SS	25	5, 6, 9, 10	24/23	96	SP	SAND AND SHELLS, GREY, MEDIUM-FINE, MEDIUM SORTED (AS ABOVE), MEDIUM DENSE
7	SS		7, 6, 11, 15	24/23	96	GW/SP	SHELLS (70%) and SAND (30%) SHELLS: LIGHT TAN AND WHITE, COARSE TO FINE POORLY SORTED, ANGULAR, SAND is FINE, GREY
8	SS		12, 19, 21, 3	24/24	100		WELL SORTED, QUARTZOSE. BECOMES SAND, WELL SORTED GRAY, FEW SHELL FRAGMENTS - SAMPLE QUALITY OK
9	SS	30	8, 9, 11, 11	24/23	96	SP / GW	INTERBEDDED WELL SORTED, GREY FINE SAND AND COARSE SHELL HASH - POSSIBLE UPWARDS-FINING SEQUENCES MEDIUM DENSE
10	SS		8, 8, 9, 15	24/24	100	SM	SAND (95%), BLUISH-GREY FINE-VERY FINE, ~~SLIGHTLY~~ SILTY, WELL SORTED, SUBANGULAR, SLIGHTLY MOIST MEDIUM DENSE
11	SS	35	9, 7, 7, 9	24/23	96		
12	SS		5, 6, 5, 7	24/23	96	SM	SAND, SILTY, AS ABOVE WITH OCCASIONAL SHELL HASH INTERVALS <1 in in THICKNESS, SLIGHTLY CLAYEY IN PART, SOME WELL PRESERVED SHELLS
13	SS		5, 3, 3, 3	24/23	96	SM	SAND, SILTY BLUISH-GREY, AS ABOVE, SLIGHTLY COHESIVE LOOSE
14	SS	40	2, 2, 2, 2	24/23	96	SM	SAND, SILTY, BLUISH-GREY FINE - VERY FINE, WELL SORTED, SUBANGULAR, SLIGHTLY COHESIVE, WITH OCCASIONAL WELL PRESERVED SHELLS, LOOSE
15	SS		3, 3, 3, 6	24/23	96	SM	
16	SS	45	3, 3, 4, 5	24/24	100	SM	SAND, SILTY, BLUISH-GREY FINE, AS ABOVE, LOOSE, MOIST
17	SS		2, 1, 2, 3	24/24	100	SM/SC	SAND, SILTY, BLUISH-GREY, AS ABOVE WITH INTERBEDDED CLAY (<1 in), VERY SHELLY IN PART, MOIST, VERY LOOSE
18	SS	50	1, 1, 3, 3	24/24	100	CL	CLAY, SILTY, SLIGHTLY SANDY, BLUISH-GREY, BLOCKY, PLASTIC WITH SHELLY INTERVALS

Margin notes: P/D; <ADD MUD; ADD MUD; ~~<ADD MUD~~

*SPOON FULL FROM SLOUGH

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS

SOIL BORING LOG

PAGE 1 OF 3

PROJECT: NASA - WILSON CORNERS		DATE: 8/26/96 AREA:
BORING NO.: NASA - 18	SRS COORDINATES N E	REFERENCE ELEVATION
DRILLER: ROBERT SNOW	DRILLING SUBCONTRACTOR: GEOTEK	TOTAL HOLE DEPTH: 52 ft.
TECHNICAL OVERSIGHT: JAMES WEDEKIND OVERSIGHT COMPANY: CDM FEDERAL	GROUNDWATER DEPTHS (DATE / TIME / DEPTH)	DRILLING METHODS AND DEPTHS: HOLLOW STEM AUGER

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	PID
		0					WEEDS and TOPSOIL	
1	SS		1, 1, 1, 2	24/23	96	SM	SAND, SILTY, BLACK. BECOMES LIGHT GREY, FINE, SUBANGULAR, WELL SORTED WITH ROOTS	0
2	SS		4, 4, 4, 5	24/23	96	SM	SAND, SILTY, LIGHT GREY WITH DARK BROWN STREAKS, AS ABOVE WITH ROOTS, MOIST, LOOSE	0
3	SS	5	1, 4, 4, 10	24/24	100	SM		0
4	SS		11, 11, 7, 11	24/24	100	PT / SM	PEAT, SANDY, VERY SILTY, BLACK TO DARK BROWN WITH WOOD FRAGMENTS, SLIGHTLY MOIST. GRADES TO SAND, SILTY, BROWN TO DARK BROWN, FINE SUBANGULAR, WELL SORTED, ABUNDANT ORGANICS MOIST	MAX FLUCT.
5	SS	10	4, 5, 7, 10	24/23	96	SM	SAND, SILTY, BROWN, AS ABOVE, EXCEPT WET, MEDIUM DENSE	
6	SS		7, 5, 7, 10	24/24	100	SM	SAND, SILTY, DARK-MEDIUM BROWN, FINE, SUBANGULAR, WELL SORTED OCCASIONAL PEATY LAYERS, MEDIUM DENSE, WET	
7	SS		1, 1, 1, 2	24/24	100	SM	SAND, SILTY, BROWN GRADES TO DARK GREY, FINE, SUBANGULAR WELL SORTED, WET, LOOSE - VERY LOOSE	
8	SS	15	1, 1, 1, WOH	24/24	100	SM	SAND, SILTY, DARK-MEDIUM GREY, FINE, AS ABOVE, WITH DARK GREY LAMINATION (TW)	ADD (MVD)
9	SS		5, 6, 7, 17	24/23	96	SM	SAND, SILTY, GREY FINE, SUBANGULAR, WELL SORTED WITH SOME SHELLS (<2%), WHITE, WEATHERED, SOME DARK GREY LAMINATION	
10	SS	20	6, 7, 7, 11	24/24	100	SM / SW	BECOMES SHELLS SANDY	

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

SRS
SAVANNAH RIVER SITE

SOIL BORING LOG

PROJECT NASA - WILSON CORNERS | BORING NO. NASA-1B | DATE 8/26/96

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION
11	SS	20	4, 4, 7, 8	24/24	100	GW/SP	SHELLS (70%), GREY (WITH WHITE, BLACK, TAN) COARSE-FINE, POORLY SORTED, ANGULAR WITH
12	SS		8, 9, 4, 7	24/24	100		SAND (30%) SILTY FINE, GREY WELL SORTED, SUBANGULAR, MOIST, MEDIUM DENSE
13	SS	25	5, 8, 10, 11	24/24	100	SW	SAND (60%), GREY, SILTY, FINE, WITH SHELLS (40%) COARSE-FINE, POORLY SORTED, ANGULAR, MEDIUM DENSE
14	SS		8, 9, 10, 12	24/24	100	SW (GW/SP)	SAND (60%), GREY, SILTY, AS ABOVE WITH SHELLS (40%) (~30% SLOUGH)
15	SS		9, 10, 11, 11	24/24	100	SW (GW/SP)	SAND (60%) (SW), GREY, SILTY, FINE, SUBANGULAR, WELL SORTED
16	SS	30	10, 11, 17, 20	24/24	100	GW/SP	SHELLS (30%), VARIABLY COLORED (GREY, BLACK, WHITE, TAN) ANGULAR, POORLY SORTED (MEDIUM-FINE), MOIST, MEDIUM DENSE (~90% SLOUGH) (GW)
17	SS		7, 8, 16, 20	24/24	100	GW/SP	SHELLS (60-70%) VERY LIGHT GREYISH BROWN OR TAN, COARSE-FINE, POORLY SORTED, ANGULAR WITH
18	SS	35	3, 9, 12, 12	24/24	100	GW/SP	SAND (40-30%), GREY, FINE, SUBANGULAR, WELL SORTED QUARTZOSE WITH <1% OPAQUE MINERALS, MEDIUM DENSE, MOIST, BECOMES SAND, SHELLY AT 18 ft
19	SS		9, 11, 12, 12	24/24	100	SP	SAND, GREY TO BLUISH GREY, FINE-VERY FINE, SUBANGULAR WELL SORTED, WITH FEW SHELLS
20	SS		9, 10, 11, 11	24/24	100		SAND, BLUE-GREY, FINE-VERY FINE, SUBANGULAR WELL SORTED WITH SHELL - (2-10%) ANGULAR
21	SS	40	5, 5, 5, 8	24/24	100	SP/SM	MEDIUM FINE, MODERATELY SORTED, SLIGHTLY MOIST MEDIUM DENSE
22	SS		6, 6, 8, 9	24/24	100	SM	SAND, SILTY BLUE-GREY, FINE-VERY FINE, SUBANGULAR, WELL SORTED WITH WELL PRESERVED SHELLS AND SOME FINE SHELL DEBRIS
23	SS	45	5, 8, 5, 10	24/23	96	SM	SAND, SILTY BLUE-GREY, FINE, AS ABOVE, WITH ~~OCCASIONAL~~ COMMON WELL PRESERVED SHELLS
24	SS		2, 2, 4, 7	24/23	96	SM	SAND, SILTY, BLUE-GREY, AS ABOVE, WITH MANY WHOLE SHELLS
25	SS	50	2, 1, 4, 8	24/23	96	SM	SAND, SILTY, SLIGHTLY CLAYEY FINE-VERY FINE, BLUE-GREY, AS ABOVE WITH WELL PRESERVED SHELLS

< ADD MUD

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS

SOIL BORING LOG

PAGE 3 OF 3

PROJECT NASA - Wilson Corners | BORING NO. NASA-18 | DATE 8/26/96

SAMPLING NO.	SAMPLING TYPE	SAMPLING DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION
		50	2			SM	SAND, SILTY, WITH SHELLS, AS BEFORE
26	SS		3	24/23	96		
			3			CL	CLAY, SILTY, SANDY, BLUE-GREY, PLASTIC, WITH FEW
			5				SHELLS, WELL PRESERVED, IN LAYERS <1/4" thick or
27							DISEMINATED IN MATRIX
		55					
							TOTAL DEPTH @ 52 ft.
		60					
		65					
		70					
		75					
		80					

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

OSR 14-366 (Rev. 10/92)

SRS

SOIL BORING LOG

PAGE 1 OF 2

PROJECT NASA-WILSON CORNERS		DATE 8/24/96 AREA
BORING NO. NASA-~~15~~ 19	SRS COORDINATES N E	REFERENCE ELEVATION
DRILLER Robert Snow	DRILLING SUBCONTRACTOR Geotek	TOTAL HOLE DEPTH 50 ft.
TECHNICAL OVERSIGHT James Wedekind	GROUNDWATER DEPTHS DATE TIME DEPTH	DRILLING METHODS AND DEPTHS Hollow Stem Auger With Bentonite Mud
OVERSIGHT COMPANY CDM Federal		

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION
		0					Grass
1	SS		1, 2, 1, 2	24/23	96	SM	Sand, silty, light grey with black streaks, fine, subangular, well-medium sorted, some organics roots, dry, loose
2	SS		4, 4, 3, 4	24/23	96	SM / PL	Sand, silty, light grey moist. Peat, very silty, sandy, abundant organics, roots dry loose
3	SS	5	1, 3, 5, 8	24/21	100	SM / PL?	Poor sample (probably 70% slough)
4	SS		8, 12, 13, 12	24/24	100	SM / PL	Sand silty light grey, fine, subangular, well sorted, wet, grades grey-black. Peat, as above, medium dense
5	SS	10	1, 1, 3, 3	24/24	100	SM	Sand, very silty, peaty, fine, subangular, medium-well sorted, brown to dark brown, moist, loose
6	SS		1, 1, 1, WOH	24/24	100	SM	Sand, very silty, dark brown - brown, saturated as above
7	SS			NS	0	NS	No sample 12-14 ft (probably silty sand)
8	SS	15	2, 1, 1, 1	24/24	100	SM	Sand, silty, brownish-grey fine, subangular, well sorted, very loose, wet
9	SS		3, 4, 7, 10	24/24	100	SM	Sand, silty, grey and mottled brown, fine, subangular, well sorted, medium dense, wet
10	SS	20	1, 2, 4, 4	24/18	80	GW/SP	Shells (60-70%), variably colored (grey, white), coarse-medium, angular, poorly sorted with sand, grey, fine, well sorted, moist, loose (add mud)

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

- PID Malfunctioning - did not use

OSR 14-366 (Rev. 10/92)

SRS

SOIL BORING LOG

PAGE 2 OF 2

PROJECT NASA-WILSON CORNERS BORING NO. NASA-19 DATE 8/24/96

SAMPLING NO.	TYPE	DEPTH	6-INCH BLOW COUNTS	IN. DRIV. / IN. REC.	% REC.	LITHOLOGY	DESCRIPTION	
11	SS	20	3, 6, 8, 10	24/24	100	SP/GW	SAND, GREY, FINE, SLIGHTLY SILTY, SUBANGULAR, WELL SORTED WITH SHELLS (50-40%), BROKEN (SHELL HASH), VARIABLY COLORED (BLACK, GREY, WHITE, TAN), ANGULAR, POORLY SORTED, MEDIUM DENSE	
12	SS		9, 9, 11, 11	24/24	100			
13	SS	25	3, 4, 4, 5	24/23	96	SP/GW	SAND, GREY, FINE SLIGHTLY SILTY, AS ABOVE WITH SHELL HASH ABUNDANT, PRIMARY POROSITY, MOIST, LOOSE	
14	SS		9, 10, 11, 9	24/23	96	SW	SAND, GREY, GRADES TO LIGHT GREY @ 27 ft. FINE-COARSE (SHELLS), POORLY SORTED, ANGULAR TO SUBANGULAR, LAMINATED IN PART, SHELLS 40-10%	
15	SS	30	9, 15, 28, 13/2"	24/23	96	SW/SP	SAND, GREY, COARSE-FINE W/ SHELLS, BECOMES SAND, GREY, FINE TO VERY FINE, WELL SORTED, SUBANGULAR	ABUNDANT SLOUGH (31 ft) < ADD MUD
16	SS		9, 10, 15, 17	24/23	92 / 96		WITH FEW SHELL FRAGMENTS, MOIST, MEDIUM DENSE QUARTZOSE, WITH OPAQUE MINERALS (2%) INTERBEDDED FACIES - POSSIBLY UPWARDS FINING SEQUENCES	
17	SS		8, 10, 13, 13	24/23	96	SW (SP/GW)	SAND (70%), GREY, FINE, WELL SORTED AND SHELLS COARSE-FINE, POORLY SORTED, ANGULAR	
18	SS	35	8, 12, 17, 21	24/23	96	SP/GW	SAND (60-70%) GREY FINE, AS ABOVE WITH SHELLS, COARSE-MEDIUM, AS ABOVE, DENSE	
19	SS		9, 11, 15, 21	24/24	100	SW	SAND (80%) GREY TO BLUISH GREY, FINE, SLIGHTLY SILTY WITH OCCASIONAL SHELLS, LOCALLY ABUNDANT AS SHELL HASH LAYERS OR DISSEMINATED IN SAND MATRIX	< ADD MUD
20	SS	40	5, 5, 7, 12	24/22	92	SW/SM	MEDIUM DENSE, MOIST	
21	SS		3, 12, 10, 11	24/23	96	SM	SAND (90%) SILTY BLUISH GREY, FINE TO VERY FINE, SUBANGULAR, WELL-MEDIUM SORTED, WITH SHELLS (10%) WELL PRESERVED, USUALLY BROKEN, ANGULAR, SLIGHTLY PLASTIC, MOIST, MEDIUM DENSE	
22	SS		6, 8, 11, 15	24/23	96	SM	SAND (90%), BLUISH GREY, FINE TO VERY FINE, SILTY, AS ABOVE, MOIST, SLIGHTLY PLASTIC	< ADD MUD
23	SS	45	3, 3, 8, 10	24/22	92	SM	SAND, SILTY, SLIGHTLY CLAYEY, FINE TO VERY FINE BLUISH-GREY, AS ABOVE, EXCEPT OCCASIONAL WHOLE SHELLS	
24	SS		3, 2, 3, 4	24/23	96	SM	SAND, SILTY, SLIGHTLY CLAYEY, AS ABOVE, SHELL LAYER @ 46.5 ft - WELL PRESERVED	
25	SS	50	5, 3, 3, 4	24/24	100	SC/SM - CL	SAND, CLAYEY, SILTY, BLUE-GREY, WITH ABUNDANT SHELLS, BECOMES CLAY, SILTY, SANDY WITH ABUNDANT SHELLS, PLASTIC (49-50 ft CLAY)	

T.D. @ 50'

Samples Submitted for Laboratory Tests

NOTE: Standard Penetration Resistance is Sum of Blows for 2nd - 6" and 3rd - 6" to Drive 1-3/8" I.D., 2" O.D. Split Barrel Sampler with 140 pound hammer falling 30 inches.

Appendix B

Results from Headspace Analysis of Sediment Samples Collected at the Wilson's Corner Site

	feet		ug/kg				
Loc. Id	depth	elevation	VCl	F-113	cis-DCE	TCE	Samp. Id
NASA-1	1	6.25	<0.001	<0.001	<0.001	<0.001	NASA0100
NASA-1	3	4.25	<0.001	<0.001	<0.001	<0.001	NASA0101
NASA-1	5	2.25	<0.001	<0.001	<0.001	<0.001	NASA0102
NASA-1	7	0.25	<0.001	<0.001	0.005	<0.001	NASA0103
NASA-1	9	-1.75	<0.001	<0.001	0.003	<0.001	NASA0104
NASA-1	11	-3.75	<0.001	<0.001	<0.001	<0.001	NASA0105
NASA-1	13	-5.75	<0.001	<0.001	<0.001	<0.001	NASA0106
NASA-1	15	-7.75	<0.001	<0.001	<0.001	<0.001	NASA0107
NASA-1	17	-9.75	<0.001	<0.001	<0.001	<0.001	NASA0108
NASA-1	19	-11.75	<0.001	<0.001	<0.001	<0.001	NASA0109
NASA-1	21	-13.75	<0.001	<0.001	<0.001	<0.001	NASA0110
NASA-1	23	-15.75	<0.001	<0.001	<0.001	<0.001	NASA0111
NASA-1	25	-17.75	<0.001	<0.001	0.005	<0.001	NASA0112
NASA-1	27	-19.75	<0.001	<0.001	<0.001	<0.001	NASA0113
NASA-1	29	-21.75	<0.001	<0.001	<0.001	<0.001	NASA0114
NASA-1	31	-23.75	<0.001	<0.001	<0.001	0.002	NASA0115
NASA-1	33	-25.75	<0.001	<0.001	0.002	0.004	NASA0116
NASA-1	35	-27.75	<0.001	<0.001	0.005	0.003	NASA0117
NASA-1	37	-29.75	<0.001	<0.001	0.007	0.020	NASA0118
NASA-1	39	-31.75	<0.001	<0.001	0.019	0.042	NASA0119
NASA-1	41	-33.75	0.294	0.002	4.756	2.739	NASA0120
NASA-1	43	-35.75	1.016	0.008	18.661	9.805	NASA0121
NASA-1	45	-37.75	0.256	0.001	3.873	2.022	NASA0122
NASA-1	47	-39.75	0.883	0.003	7.349	2.174	NASA0123
NASA-1	49	-41.75	0.727	0.002	3.425	1.011	NASA0124
NASA-1	51	-43.75	0.913	0.002	2.986	0.481	NASA0125
NASA-1	52.5	-45.25	<0.001	<0.001	<0.001	<0.001	NASA0126
NASA-1	53.5	-46.25	0.206	<0.001	<0.001	<0.001	NASA0127
NASA-2	1	7.70	0.896	<0.001	<0.001	<0.001	NASA0200
NASA-2	3	5.70	<0.001	<0.001	<0.001	<0.001	NASA0201
NASA-2	4.5	4.20	0.766	<0.001	<0.001	<0.001	NASA0202
NASA-2	7.5	1.20	1.470	<0.001	0.075	<0.001	NASA0204
NASA-2	12.5	-3.80	<0.001	<0.001	0.013	<0.001	NASA0206
NASA-2	14	-5.30	0.242	<0.001	0.009	<0.001	NASA0207
NASA-2	22.5	-13.80	1.053	<0.001	<0.001	0.002	NASA0212
NASA-2	29.5	-20.80	0.398	<0.001	<0.001	<0.001	NASA0215
NASA-2	35	-26.30	<0.001	<0.001	<0.001	<0.001	NASA0218
NASA-2	39.5	-30.80	<0.001	<0.001	0.033	0.009	NASA0220
NASA-2	41	-32.30	0.225	<0.001	<0.001	<0.001	NASA0221
NASA-2	43	-34.30	<0.001	<0.001	0.036	0.002	NASA0222
NASA-2	45	-36.30	<0.001	<0.001	<0.001	0.001	NASA0223
NASA-2	47	-38.30	<0.001	<0.001	<0.001	<0.001	NASA0224
NASA-2	49	-40.30	<0.001	<0.001	<0.001	<0.001	NASA0225
NASA-2	51	-42.30	0.013	<0.001	<0.001	<0.001	NASA0226
NASA-2	52	-43.30	<0.001	0.001	<0.001	<0.001	NASA0227
NASA-2	53.5	-44.80	0.526	<0.001	<0.001	<0.001	NASA0229
NASA-3	1	7.14	<0.001	<0.001	<0.001	<0.001	NASA0300

	feet		ug/kg				
Loc. Id	depth	elevation	VCl	F-113	cis-DCE	TCE	Samp. Id
NASA-3	3	5.14	0.781	<0.001	0.006	<0.001	NASA0301
NASA-3	5	3.14	0.784	0.012	0.130	0.054	NASA0302
NASA-3	7	1.14	0.739	1.016	3.210	1.110	NASA0303
NASA-3	9	-0.86	3.194	13.742	10.586	19.871	NASA0304
NASA-3	11	-2.86	2.954	13.390	10.191	15.005	NASA0305
NASA-3	13	-4.86	0.915	5.598	7.797	5.579	NASA0306
NASA-3	15	-6.86	2.820	3.718	13.812	0.808	NASA0307
NASA-3	17	-8.86	0.906	2.972	6.844	2.137	NASA0308
NASA-3	19	-10.86	0.866	3.306	5.779	1.253	NASA0309
NASA-3	21	-12.86	1.082	2.286	6.484	1.038	NASA0310
NASA-3	23	-14.86	1.027	2.906	6.886	0.810	NASA0311
NASA-3	25	-16.86	0.679	2.297	5.475	0.808	NASA0312
NASA-3	27	-18.86	0.714	4.648	6.016	6.557	NASA0313
NASA-3	29	-20.86	0.288	2.988	2.160	7.478	NASA0314
NASA-3	31	-22.86	0.555	2.622	4.235	4.793	NASA0315
NASA-3	33	-24.86	0.336	1.476	2.882	3.695	NASA0316
NASA-3	35	-26.86	0.436	2.074	3.253	3.745	NASA0317
NASA-3	37	-28.86	0.180	16.233	0.581	3.475	NASA0318
NASA-3	39	-30.86	<0.001	10.193	0.092	0.345	NASA0319
NASA-3	41	-32.86	<0.001	5.263	0.156	0.573	NASA0320
NASA-3	43	-34.86	0.124	7.819	0.370	1.067	NASA0321
NASA-3	45	-36.86	<0.001	11.899	0.146	0.229	NASA0322
NASA-3	47	-38.86	<0.001	5.311	0.084	0.126	NASA0323
NASA-3	48.5	-40.36	0.331	0.325	0.956	1.569	NASA0324
NASA-3	49.5	-41.36	0.741	0.103	0.041	0.013	NASA0325
NASA-4	1.5	6.66	0.651	0.022	<0.001	0.001	NASA0400
NASA-4	3	5.16	<0.001	<0.001	<0.001	<0.001	NASA0401
NASA-4	4	4.16	<0.001	0.010	0.225	2.300	NASA0402
NASA-4	5.5	2.66	0.968	0.001	0.034	0.200	NASA0403
NASA-4	8	0.16	<0.001	<0.001	0.007	0.001	NASA0404
NASA-4	11	-2.84	<0.001	<0.001	<0.001	<0.001	NASA0406
NASA-4	19	-10.84	0.540	<0.001	<0.001	0.001	NASA0410
NASA-4	21	-12.84	0.777	<0.001	<0.001	<0.001	NASA0411
NASA-4	23	-14.84	<0.001	<0.001	<0.001	<0.001	NASA0412
NASA-4	25	-16.84	<0.001	<0.001	<0.001	0.001	NASA0413
NASA-4	27	-18.84	<0.001	0.023	<0.001	<0.001	NASA0414
NASA-4	29	-20.84	<0.001	0.023	<0.001	0.002	NASA0415
NASA-4	33	-24.84	<0.001	0.046	<0.001	0.003	NASA0417
NASA-4	35	-26.84	<0.001	<0.001	<0.001	<0.001	NASA0418
NASA-4	37	-28.84	<0.001	<0.001	<0.001	<0.001	NASA0419
NASA-4	39	-30.84	<0.001	<0.001	<0.001	0.002	NASA0420
NASA-4	41	-32.84	<0.001	<0.001	<0.001	<0.001	NASA0421
NASA-4	43	-34.84	<0.001	<0.001	<0.001	<0.001	NASA0422
NASA-4	45	-36.84	<0.001	<0.001	<0.001	<0.001	NASA0423
NASA-4	47	-38.84	<0.001	<0.001	<0.001	<0.001	NASA0424
NASA-4	49	-40.84	<0.001	0.023	<0.001	0.002	NASA0425
NASA-4	51.5	-43.34	0.743	0.014	<0.001	<0.001	NASA0426

	feet		ug/kg				
Loc. Id	depth	elevation	VCl	F-113	cis-DCE	TCE	Samp. Id
NASA-5	1	7	<0.001	0.191	0.004	0.002	NASA0500
NASA-5	3	5	0.188	7.204	0.585	0.171	NASA0501
NASA-5	5	3	0.463	15.767	2.711	0.481	NASA0502
NASA-5	7	1	6.461	42.107	87.357	4.143	NASA0503
NASA-5	9	-1	4.251	21.816	45.315	2.108	NASA0504
NASA-5	11	-3	1.397	11.006	7.468	0.381	NASA0505
NASA-5	13	-5	2.774	0.541	1.463	0.021	NASA0506
NASA-5	15	-7	3.049	0.816	1.346	0.030	NASA0507
NASA-5	17	-9	3.493	0.099	0.936	0.005	NASA0508
NASA-5	19	-11	0.753	0.015	0.358	<0.001	NASA0509
NASA-5	21	-13	1.522	1.267	1.081	0.054	NASA0510
NASA-5	23	-15	0.606	0.856	0.570	0.030	NASA0511
NASA-5	25	-17	0.285	1.309	0.750	0.161	NASA0512
NASA-5	27	-19	0.282	1.101	0.752	0.149	NASA0513
NASA-5	29	-21	0.473	1.314	0.857	0.792	NASA0514
NASA-5	31	-23	1.585	5.454	2.756	0.546	NASA0515
NASA-5	34	-26	0.222	1.069	0.721	0.310	NASA0516
NASA-5	35	-27	<0.001	1.178	0.771	0.907	NASA0517
NASA-5	37	-29	0.076	1.270	0.998	1.698	NASA0518
NASA-5	39	-31	0.323	1.861	2.657	4.724	NASA0519
NASA-5	41	-33	0.191	0.787	0.711	0.574	NASA0520
NASA-5	43	-35	0.182	<0.001	<0.001	<0.001	NASA0521
NASA-5	45	-37	<0.001	<0.001	<0.001	<0.001	NASA0522
NASA-5	47	-39	<0.001	<0.001	<0.001	<0.001	NASA0523
NASA-5	49	-41	0.586	1.572	1.584	0.908	NASA0524
NASA-5	49.5	-42	<0.001	<0.001	<0.001	<0.001	NASA0525
NASA-6	1	5.32	<0.001	<0.001	<0.001	<0.001	NASA0600
NASA-6	3	3.32	<0.001	<0.001	<0.001	<0.001	NASA0601
NASA-6	5	1.32	<0.001	<0.001	<0.001	<0.001	NASA0602
NASA-6	7	-0.68	<0.001	<0.001	<0.001	<0.001	NASA0603
NASA-6	9	-2.68	<0.001	<0.001	<0.001	<0.001	NASA0604
NASA-6	11	-4.68	<0.001	<0.001	<0.001	<0.001	NASA0605
NASA-6	13	-6.68	<0.001	<0.001	<0.001	<0.001	NASA0606
NASA-6	15	-8.68	<0.001	<0.001	<0.001	<0.001	NASA0607
NASA-6	17	-10.68	<0.001	<0.001	<0.001	<0.001	NASA0608
NASA-6	19	-12.68	<0.001	<0.001	<0.001	<0.001	NASA0609
NASA-6	21	-14.68	<0.001	<0.001	<0.001	<0.001	NASA0610
NASA-6	23	-16.68	<0.001	<0.001	<0.001	<0.001	NASA0611
NASA-6	25	-18.68	<0.001	<0.001	<0.001	<0.001	NASA0612
NASA-6	27	-20.68	<0.001	<0.001	0.001	<0.001	NASA0613
NASA-6	29	-22.68	<0.001	<0.001	<0.001	<0.001	NASA0614
NASA-6	31	-24.68	<0.001	<0.001	0.003	0.002	NASA0615
NASA-6	33	-26.68	<0.001	<0.001	0.033	<0.001	NASA0616
NASA-6	35	-28.68	<0.001	<0.001	<0.001	<0.001	NASA0617
NASA-6	37	-30.68	<0.001	<0.001	0.065	0.002	NASA0618
NASA-6	39	-32.68	5.384	<0.001	0.689	<0.001	NASA0619
NASA-6	41	-34.68	5.832	<0.001	1.101	<0.001	NASA0620

	feet		ug/kg				
Loc. Id	depth	elevation	VCl	F-113	cis-DCE	TCE	Samp. Id
NASA-6	43	-36.68	1.982	<0.001	0.444	<0.001	NASA0621
NASA-6	45	-38.68	2.015	<0.001	0.412	<0.001	NASA0622
NASA-6	47	-40.68	<0.001	<0.001	<0.001	<0.001	NASA0623
NASA-6	48.5	-42.18	<0.001	<0.001	<0.001	<0.001	NASA0624
NASA-6	49.5	-43.18	1.165	<0.001	<0.001	<0.001	NASA0625
NASA-7	1	6.24	<0.001	<0.001	<0.001	<0.001	NASA0700
NASA-7	3	4.24	<0.001	<0.001	<0.001	<0.001	NASA0701
NASA-7	5	2.24	<0.001	<0.001	<0.001	<0.001	NASA0702
NASA-7	7	0.24	<0.001	<0.001	0.005	<0.001	NASA0703
NASA-7	9	-1.76	<0.001	<0.001	0.014	<0.001	NASA0704
NASA-7	11	-3.76	<0.001	<0.001	0.010	<0.001	NASA0705
NASA-7	13	-5.76	<0.001	<0.001	<0.001	<0.001	NASA0706
NASA-7	15	-7.76	<0.001	<0.001	0.003	<0.001	NASA0707
NASA-7	17	-9.76	<0.001	<0.001	<0.001	<0.001	NASA0708
NASA-7	19	-11.76	<0.001	<0.001	<0.001	<0.001	NASA0709
NASA-7	21	-13.76	<0.001	<0.001	<0.001	<0.001	NASA0710
NASA-7	23	-15.76	<0.001	<0.001	<0.001	<0.001	NASA0711
NASA-7	25	-17.76	<0.001	<0.001	<0.001	<0.001	NASA0712
NASA-7	27	-19.76	<0.001	<0.001	<0.001	<0.001	NASA0713
NASA-7	29	-21.76	<0.001	<0.001	<0.001	<0.001	NASA0714
NASA-7	31	-23.76	<0.001	<0.001	<0.001	<0.001	NASA0715
NASA-7	33	-25.76	<0.001	<0.001	<0.001	<0.001	NASA0716
NASA-7	35	-27.76	<0.001	<0.001	0.019	0.007	NASA0717
NASA-7	37	-29.76	2.894	<0.001	0.143	0.003	NASA0718
NASA-7	39	-31.76	<0.001	<0.001	<0.001	<0.001	NASA0719
NASA-7	41	-33.76	2.296	<0.001	0.173	0.001	NASA0720
NASA-7	43	-35.76	1.137	<0.001	0.011	<0.001	NASA0721
NASA-7	45	-37.76	<0.001	<0.001	<0.001	<0.001	NASA0722
NASA-7	47	-39.76	<0.001	<0.001	<0.001	<0.001	NASA0723
NASA-7	48.5	-41.26	<0.001	<0.001	0.030	<0.001	NASA0724
NASA-7	49.5	-42.26	<0.001	<0.001	<0.001	<0.001	NASA0725
NASA-9	15	-8.03	<0.001	<0.001	<0.001	<0.001	NASA0900
NASA-9	18	-11.03	<0.001	<0.001	<0.001	<0.001	NASA0901
NASA-9	20	-13.03	<0.001	<0.001	<0.001	<0.001	NASA0902
NASA-9	21	-14.03	<0.001	<0.001	<0.001	<0.001	NASA0903
NASA-9	23	-16.03	<0.001	<0.001	<0.001	<0.001	NASA0904
NASA-9	25	-18.03	<0.001	<0.001	<0.001	<0.001	NASA0905
NASA-9	27	-20.03	<0.001	<0.001	<0.001	<0.001	NASA0906
NASA-9	29	-22.03	<0.001	<0.001	<0.001	<0.001	NASA0907
NASA-9	31	-24.03	<0.001	<0.001	<0.001	<0.001	NASA0908
NASA-9	33	-26.03	<0.001	<0.001	<0.001	<0.001	NASA0909
NASA-9	35	-28.03	<0.001	<0.001	<0.001	<0.001	NASA0910
NASA-9	37.5	-30.53	<0.001	<0.001	<0.001	<0.001	NASA0911
NASA-9	40	-33.03	<0.001	<0.001	<0.001	<0.001	NASA0912
NASA-9	41	-34.03	<0.001	<0.001	<0.001	<0.001	NASA0913
NASA-9	43	-36.03	<0.001	<0.001	<0.001	<0.001	NASA0914
NASA-9	45	-38.03	<0.001	<0.001	<0.001	<0.001	NASA0915

Loc. Id	feet		ug/kg				Samp. Id
	depth	elevation	VCl	F-113	cis-DCE	TCE	
NASA-9	47	-40.03	<0.001	<0.001	<0.001	<0.001	NASA0916
NASA-9	49	-42.03	<0.001	<0.001	<0.001	<0.001	NASA0917
NASA-9	49.5	-42.53	<0.001	<0.001	<0.001	<0.001	NASA0918
NASA-10	15	-9.47	<0.001	<0.001	<0.001	<0.001	NASA1000
NASA-10	17.5	-11.97	<0.001	<0.001	<0.001	<0.001	NASA1001
NASA-10	19.5	-13.97	<0.001	<0.001	<0.001	<0.001	NASA1002
NASA-10	21	-15.47	<0.001	<0.001	<0.001	<0.001	NASA1003
NASA-10	23	-17.47	<0.001	<0.001	<0.001	<0.001	NASA1004
NASA-10	25	-19.47	<0.001	<0.001	<0.001	<0.001	NASA1005
NASA-10	27	-21.47	<0.001	<0.001	<0.001	<0.001	NASA1006
NASA-10	29	-23.47	<0.001	<0.001	<0.001	<0.001	NASA1007
NASA-10	31	-25.47	<0.001	<0.001	<0.001	<0.001	NASA1008
NASA-10	33	-27.47	<0.001	<0.001	<0.001	<0.001	NASA1009
NASA-10	35	-29.47	<0.001	<0.001	<0.001	<0.001	NASA1010
NASA-10	37	-31.47	<0.001	<0.001	<0.001	<0.001	NASA1011
NASA-10	39	-33.47	<0.001	<0.001	<0.001	<0.001	NASA1012
NASA-10	41	-35.47	<0.001	<0.001	<0.001	<0.001	NASA1013
NASA-10	43	-37.47	<0.001	<0.001	<0.001	<0.001	NASA1014
NASA-10	45	-39.47	<0.001	<0.001	<0.001	<0.001	NASA1015
NASA-10	47	-41.47	<0.001	<0.001	<0.001	<0.001	NASA1016
NASA-10	49.8	-44.27	<0.001	<0.001	<0.001	<0.001	NASA1017
NASA-10	50	-44.47	<0.001	<0.001	<0.001	<0.001	NASA1018
NASA-11	1	8.64	<0.001	<0.001	<0.001	<0.001	NASA1100
NASA-11	3	6.64	<0.001	<0.001	<0.001	<0.001	NASA1101
NASA-11	5	4.64	<0.001	<0.001	<0.001	<0.001	NASA1102
NASA-11	7	2.64	<0.001	<0.001	<0.001	<0.001	NASA1103
NASA-11	9	0.64	<0.001	<0.001	<0.001	<0.001	NASA1104
NASA-11	11	-1.36	<0.001	<0.001	<0.001	<0.001	NASA1105
NASA-11	13	-3.36	<0.001	<0.001	<0.001	<0.001	NASA1106
NASA-11	15	-5.36	<0.001	<0.001	<0.001	<0.001	NASA1107
NASA-11	17	-7.36	<0.001	<0.001	<0.001	<0.001	NASA1108
NASA-11	19	-9.36	<0.001	<0.001	<0.001	<0.001	NASA1109
NASA-11	21	-11.36	<0.001	<0.001	<0.001	<0.001	NASA1110
NASA-11	23	-13.36	<0.001	<0.001	<0.001	<0.001	NASA1111
NASA-11	25	-15.36	<0.001	<0.001	<0.001	<0.001	NASA1112
NASA-11	27	-17.36	<0.001	<0.001	<0.001	<0.001	NASA1113
NASA-11	29	-19.36	<0.001	<0.001	<0.001	<0.001	NASA1114
NASA-11	31	-21.36	<0.001	<0.001	<0.001	<0.001	NASA1115
NASA-11	33	-23.36	<0.001	<0.001	<0.001	<0.001	NASA1116
NASA-11	35	-25.36	<0.001	<0.001	<0.001	<0.001	NASA1117
NASA-11	37	-27.36	<0.001	0.002	<0.001	<0.001	NASA1118
NASA-11	39	-29.36	<0.001	<0.001	<0.001	<0.001	NASA1119
NASA-11	41	-31.36	<0.001	<0.001	<0.001	<0.001	NASA1120
NASA-11	43	-33.36	<0.001	<0.001	<0.001	<0.001	NASA1121
NASA-11	45	-35.36	<0.001	<0.001	<0.001	<0.001	NASA1122
NASA-11	47	-37.36	<0.001	<0.001	<0.001	<0.001	NASA1123
NASA-11	49	-39.36	<0.001	<0.001	<0.001	<0.001	NASA1124

Loc. Id	feet		ug/kg				Samp. Id
	depth	elevation	VCl	F-113	cis-DCE	TCE	
NASA-11	50.5	-40.86	<0.001	<0.001	<0.001	<0.001	NASA1125
NASA-11	51.5	-41.86	<0.001	0.004	<0.001	0.001	NASA1126
NASA-14	1	7.52	<0.001	<0.001	<0.001	<0.001	NASA1400
NASA-14	3	5.52	<0.001	<0.001	<0.001	<0.001	NASA1401
NASA-14	5	3.52	<0.001	<0.001	<0.001	<0.001	NASA1402
NASA-14	7	1.52	<0.001	<0.001	<0.001	<0.001	NASA1403
NASA-14	9	-0.48	<0.001	<0.001	0.046	<0.001	NASA1404
NASA-14	11	-2.48	<0.001	<0.001	<0.001	<0.001	NASA1405
NASA-14	13.5	-4.98	<0.001	<0.001	0.023	<0.001	NASA1406
NASA-14	15	-6.48	<0.001	<0.001	<0.001	<0.001	NASA1407
NASA-14	17	-8.48	<0.001	<0.001	<0.001	<0.001	NASA1408
NASA-14	21	-12.48	0.629	<0.001	0.022	0.002	NASA1409
NASA-14	23	-14.48	0.925	<0.001	0.223	0.003	NASA1410
NASA-14	25	-16.48	0.138	<0.001	0.313	0.007	NASA1411
NASA-14	27	-18.48	0.019	<0.001	0.510	0.016	NASA1412
NASA-14	29	-20.48	<0.001	<0.001	0.322	0.013	NASA1413
NASA-14	31	-22.48	<0.001	<0.001	0.057	0.002	NASA1414
NASA-14	33	-24.48	<0.001	<0.001	0.075	0.007	NASA1415
NASA-14	35	-26.48	<0.001	<0.001	0.043	0.002	NASA1416
NASA-14	37	-28.48	<0.001	<0.001	0.127	0.052	NASA1417
NASA-14	39	-30.48	<0.001	<0.001	<0.001	<0.001	NASA1418
NASA-14	41	-32.48	0.066	<0.001	0.363	0.128	NASA1419
NASA-14	43	-34.48	1.442	<0.001	0.443	0.164	NASA1420
NASA-14	45	-36.48	0.624	<0.001	0.007	0.004	NASA1421
NASA-14	47	-38.48	<0.001	<0.001	<0.001	<0.001	NASA1422
NASA-14	49	-40.48	<0.001	<0.001	<0.001	<0.001	NASA1423
NASA-14	51	-42.48	<0.001	<0.001	0.046	0.021	NASA1424
NASA-14	52.5	-43.98	<0.001	<0.001	<0.001	<0.001	NASA1425
NASA-14	53.5	-44.98	<0.001	<0.001	<0.001	<0.001	NASA1426
NASA-16	1	7.44	<0.001	<0.001	<0.001	<0.001	NASA1600
NASA-16	3	5.44	0.088	<0.001	<0.001	<0.001	NASA1601
NASA-16	5	3.44	<0.001	<0.001	<0.001	<0.001	NASA1602
NASA-16	7	1.44	1.071	1.421	0.277	0.093	NASA1603
NASA-16	9	-0.56	1.013	<0.001	0.749	<0.001	NASA1604
NASA-16	11	-2.56	<0.001	0.030	0.063	0.017	NASA1605
NASA-16	13	-4.56	<0.001	0.009	0.018	0.006	NASA1606
NASA-16	15	-6.56	0.765	0.006	0.595	0.009	NASA1607
NASA-16	17	-8.56	0.386	0.029	0.387	0.021	NASA1608
NASA-16	19.75	-11.31	<0.001	<0.001	<0.001	<0.001	NASA1609
NASA-16	21	-12.56	<0.001	<0.001	<0.001	<0.001	NASA1610
NASA-16	23	-14.56	<0.001	<0.001	0.007	<0.001	NASA1611
NASA-16	25	-16.56	<0.001	<0.001	<0.001	<0.001	NASA1612
NASA-16	27.5	-19.06	0.002	<0.001	<0.001	<0.001	NASA1613
NASA-16	29	-20.56	<0.001	<0.001	<0.001	<0.001	NASA1614
NASA-16	31	-22.56	0.197	<0.001	<0.001	<0.001	NASA1615
NASA-16	33	-24.56	<0.001	<0.001	<0.001	<0.001	NASA1616
NASA-16	35	-26.56	<0.001	<0.001	<0.001	<0.001	NASA1617

Loc. Id	feet		ug/kg				Samp. Id
	depth	elevation	VCl	F-113	cis-DCE	TCE	
NASA-16	37	-28.56	<0.001	<0.001	<0.001	<0.001	NASA1618
NASA-16	39	-30.56	0.148	<0.001	<0.001	<0.001	NASA1619
NASA-16	41	-32.56	<0.001	<0.001	<0.001	<0.001	NASA1620
NASA-16	43	-34.56	0.188	<0.001	<0.001	<0.001	NASA1621
NASA-16	45	-36.56	<0.001	<0.001	<0.001	<0.001	NASA1622
NASA-16	47	-38.56	<0.001	<0.001	<0.001	<0.001	NASA1623
NASA-16	48.5	-40.06	<0.001	<0.001	0.007	<0.001	NASA1624
NASA-16	49.5	-41.06	0.129	<0.001	<0.001	<0.001	NASA1625
NASA-17	15	-10.01	<0.001	<0.001	<0.001	<0.001	NASA1700
NASA-17	17	-12.01	<0.001	<0.001	<0.001	<0.001	NASA1701
NASA-17	19	-14.01	<0.001	<0.001	<0.001	<0.001	NASA1702
NASA-17	21	-16.01	<0.001	<0.001	<0.001	<0.001	NASA1703
NASA-17	23	-18.01	<0.001	<0.001	<0.001	<0.001	NASA1704
NASA-17	25	-20.01	<0.001	<0.001	<0.001	<0.001	NASA1705
NASA-17	27	-22.01	<0.001	<0.001	<0.001	<0.001	NASA1706
NASA-17	29	-24.01	<0.001	<0.001	<0.001	<0.001	NASA1707
NASA-17	31	-26.01	<0.001	<0.001	<0.001	<0.001	NASA1708
NASA-17	33	-28.01	<0.001	<0.001	<0.001	<0.001	NASA1709
NASA-17	35	-30.01	<0.001	<0.001	<0.001	<0.001	NASA1710
NASA-17	37	-32.01	<0.001	<0.001	<0.001	<0.001	NASA1711
NASA-17	39	-34.01	<0.001	<0.001	<0.001	<0.001	NASA1712
NASA-17	41	-36.01	<0.001	0.003	<0.001	<0.001	NASA1713
NASA-17	43	-38.01	<0.001	<0.001	<0.001	<0.001	NASA1714
NASA-17	45	-40.01	<0.001	<0.001	<0.001	<0.001	NASA1715
NASA-17	47	-42.01	<0.001	<0.001	<0.001	<0.001	NASA1716
NASA-17	49.3	-44.31	<0.001	<0.001	<0.001	<0.001	NASA1717
NASA-17	49.8	-44.81	<0.001	<0.001	<0.001	<0.001	NASA1718
NASA-18	1	7.46	<0.001	0.001	<0.001	<0.001	NASA1800
NASA-18	3	5.46	<0.001	<0.001	<0.001	<0.001	NASA1801
NASA-18	5	3.46	<0.001	<0.001	<0.001	<0.001	NASA1802
NASA-18	7	1.46	<0.001	1.297	0.009	<0.001	NASA1803
NASA-18	9	-0.54	<0.001	0.083	0.030	<0.001	NASA1804
NASA-18	11	-2.54	<0.001	0.007	0.023	<0.001	NASA1805
NASA-18	13	-4.54	<0.001	0.122	0.012	<0.001	NASA1806
NASA-18	15	-6.54	<0.001	<0.001	<0.001	<0.001	NASA1807
NASA-18	17	-8.54	<0.001	<0.001	<0.001	<0.001	NASA1808
NASA-18	19	-10.54	<0.001	<0.001	<0.001	<0.001	NASA1809
NASA-18	21	-12.54	<0.001	<0.001	<0.001	<0.001	NASA1810
NASA-18	23	-14.54	<0.001	<0.001	<0.001	<0.001	NASA1811
NASA-18	25	-16.54	<0.001	<0.001	<0.001	<0.001	NASA1812
NASA-18	27	-18.54	<0.001	<0.001	<0.001	<0.001	NASA1813
NASA-18	29	-20.54	<0.001	0.005	<0.001	<0.001	NASA1814
NASA-18	31	-22.54	<0.001	0.002	<0.001	<0.001	NASA1815
NASA-18	33	-24.54	<0.001	<0.001	<0.001	<0.001	NASA1816
NASA-18	35	-26.54	<0.001	<0.001	<0.001	<0.001	NASA1817
NASA-18	37	-28.54	<0.001	0.002	<0.001	<0.001	NASA1818
NASA-18	39	-30.54	<0.001	0.008	<0.001	<0.001	NASA1819

	feet		ug/kg				
Loc. Id	depth	elevation	VCI	F-113	cis-DCE	TCE	Samp. Id
NASA-18	41	-32.54	<0.001	<0.001	<0.001	<0.001	NASA1820
NASA-18	43	-34.54	<0.001	<0.001	<0.001	<0.001	NASA1821
NASA-18	45	-36.54	<0.001	<0.001	<0.001	<0.001	NASA1822
NASA-18	47	-38.54	<0.001	<0.001	<0.001	<0.001	NASA1823
NASA-18	49	-40.54	<0.001	<0.001	<0.001	<0.001	NASA1824
NASA-18	51.5	-43.04	<0.001	<0.001	<0.001	<0.001	NASA1825
NASA-18	50.5	-42.04	<0.001	<0.001	<0.001	<0.001	NASA1826
NASA-19	1	6.15	<0.001	<0.001	<0.001	<0.001	NASA1900
NASA-19	3	4.15	<0.001	<0.001	<0.001	<0.001	NASA1901
NASA-19	5	2.15	<0.001	<0.001	<0.001	<0.001	NASA1902
NASA-19	7	0.15	<0.001	<0.001	<0.001	<0.001	NASA1903
NASA-19	9	-1.85	<0.001	<0.001	<0.001	<0.001	NASA1904
NASA-19	11	-3.85	<0.001	<0.001	<0.001	<0.001	NASA1905
NASA-19	15	-7.85	<0.001	<0.001	<0.001	<0.001	NASA1906
NASA-19	17	-9.85	<0.001	<0.001	<0.001	<0.001	NASA1907
NASA-19	19	-11.85	<0.001	<0.001	<0.001	<0.001	NASA1908
NASA-19	21	-13.85	<0.001	<0.001	<0.001	<0.001	NASA1909
NASA-19	23	-15.85	<0.001	<0.001	<0.001	<0.001	NASA1910
NASA-19	25	-17.85	<0.001	<0.001	<0.001	<0.001	NASA1911
NASA-19	27	-19.85	<0.001	<0.001	<0.001	<0.001	NASA1912
NASA-19	29	-21.85	<0.001	<0.001	<0.001	<0.001	NASA1913
NASA-19	31	-23.85	<0.001	<0.001	<0.001	<0.001	NASA1914
NASA-19	33	-25.85	<0.001	<0.001	<0.001	<0.001	NASA1915
NASA-19	35	-27.85	<0.001	<0.001	<0.001	<0.001	NASA1916
NASA-19	37	-29.85	<0.001	<0.001	<0.001	<0.001	NASA1917
NASA-19	39	-31.85	<0.001	<0.001	<0.001	<0.001	NASA1918
NASA-19	41	-33.85	<0.001	<0.001	<0.001	<0.001	NASA1919
NASA-19	43	-35.85	<0.001	<0.001	<0.001	<0.001	NASA1920
NASA-19	45	-37.85	<0.001	<0.001	<0.001	<0.001	NASA1921
NASA-19	47	-39.85	<0.001	<0.001	<0.001	<0.001	NASA1922
NASA-19	49	-41.85	<0.001	<0.001	<0.001	<0.001	NASA1923